

6. *TROCHOMORPHA PARTUNDA*. (Pl. XLIII. figs. 13, 14, 15.)

Shell widely and deeply umbilicated, somewhat conically lenticular, rather solid, obliquely striated, pale horn-colour, broadly banded with dark chestnut; spire convexly depressly conical, apex obtuse, suture narrowly margined; whorls five, rather convex, the last a little descending, acutely keeled, slightly convex at the base, which is sometimes brown, the colour extending to within a short distance of the keel, at other times broadly spirally banded with brown; umbilicus conical, nearly one-fifth the diameter of the shell; aperture diagonal, truncately oval; peristome nearly straight, the margins converging, the right slightly flexuous, the basal a little thickened.

Diam. maj.  $6\frac{1}{2}$ , min. 6, alt. 4 lin.

*Hab.* Galera, or Russell Island, Solomon group.

## DESCRIPTION OF PLATE XLIII.

- Figs. 1, 2, 3. *Geotrochus gamelia*, p. 888.  
 4, 5, 6. — *eros*, p. 888.  
 7, 8. — *coxiatus*, p. 889.  
 9, 10. — *ambrosia*, p. 889.  
 11, 12. — *mendana*, p. 889.  
 13, 14, 15. *Trochomorpha partunda*, p. 890.  
 16, 17. *Cœliaxis exigua*, p. 907.

---

November 28, 1867.

John Gould, Esq., F.R.S., V.P., in the Chair.

Mr. P. L. Sclater read notes upon some recent remarkable additions to the Society's Menagerie, namely:—

(1) A specimen of the Black-headed Partridge (*Caccabis melanocephala*)\* from Abyssinia, purchased October 30th; not previously exhibited in the Society's Avaries.

(2) Two Red-billed Hornbills (*Toccus erythrorhynchus*), purchased October 30th. This addition increased the Society's series of *Bucerotidæ* to eleven in number, representing the following six species:—

*Buceros bicornis*, Linn., ex. Ind.

— *rhinoceros*, Linn., ex Malacca.

— *elatus*, Temm., ex Afr. occ.

— *atratus*, Temm., ex Afr. occ.

\* *Perdix melanocephala*, Rüpp. Wirb. Abyss. i. p. 11, t. 5.

*Toccus erythrorhynchus*, Temm., ex Afr. occ.

*Bucorvus abyssinicus* (Gm.), ex Africa.

(3) A specimen of the very rare Australian Parrot lately described by Mr. Gould in the Society's 'Proceedings' (1861, p. 100) under the name of *Geopsittacus occidentalis*, presented to the Society by Dr. Ferdinand Müller, of Melbourne, C.M.Z.S., and received November 17th by the ship 'Essex,' under the special charge of Capt. Ridgers, the obliging commander of that vessel.

Dr. Müller, who had forwarded this bird to the Secretary under the impression that it was undescribed, had supplied the following particulars concerning it:—

"This peculiar Parrot was presented to me by Mr. Ryan, on whose sheep-station, on the Gawler ranges west of Spencer Gulf, it was obtained. The most extraordinary circumstance connected with this bird is, that it is *nocturnal*! It lives in the rocky caves of the ranges, and comes out at night to feed."

Mr. Sclater stated that it was evident from observations made upon this bird since it had reached the Society's Gardens that Dr. Müller's account of its nocturnal habits was correct.

---

Mr. P. L. Sclater also exhibited a skin of the Lesser Sheathbill (*Chionis minor*, Hartlaub), being that of an individual of this species which had been transmitted living to the Society by Mr. E. L. Layard, F.Z.S. This bird had been brought from the Crozet Islands by Capt. Armson, and had been for some time in the Aviary of Mr. Searle of Cape Town, who had kindly parted with it in favour of the Society.

---

An extract was read from a letter addressed to the Secretary by Capt. J. M. Dow, Corr. Memb., dated Panama, 10th September, 1867, announcing that, after many endeavours, he had succeeded in procuring for the Society a young living specimen of the newly discovered Tapir of Panama (*Tapirus bairdi*), and was intending to transmit it to the Society at an early opportunity. Capt. Dow enclosed some photographs of the animal, which were exhibited to the Meeting\*.

---

Prof. Owen communicated two memoirs on the extinct birds of the genus *Dinornis* of New Zealand, forming the eleventh and twelfth of a series of papers on this subject. These were entitled "On *Dinornis* (Part XI.), containing a description of the integument of the sole and tendons of a toe of the foot of *Dinornis robustus*;" and "On *Dinornis* (Part XII.), containing a description of the femur, tibia, and metatarsus of *Dinornis maximus*, Owen."

These papers will be published in the Society's 'Transactions.'

\* See Dr. Gray's remarks, *antea*, p. 886.

The following papers were read:—

1. On the Egg of *Æpyornis*, the Colossal Bird of Madagascar.  
By GEORGE DAWSON ROWLEY, M.A., F.Z.S. &c.

The first notice of the remains of this bird was the paper in 1851 by M. Isidore Geoffroy St.-Hilaire (*Comptes Rendus*, no. 4, 27 Janvier). Succeeding that came Professor Owen's in the 'Proceedings' of this Society (1852, p. 9). In 1863 Professor Bianconi put forth a long and painstaking discussion upon the fragments of the metatarsal which were discovered with the other bones. I had intended to have a full translation of this made from the Italian; but the result of the first part was not equal to my expectations; I therefore did not go on to the next, but believe Professor Bianconi arrives at the conclusion that *Æpyornis* might be allied to the Vultures—a notion which I do not think I need dwell upon.

In 1864, having purchased the only specimen of the egg which, as far as I know, ever came to England, I published a brochure on the subject.

This year, in August, I met M. Alfred Grandidier in Paris, and had some conversation with him respecting *Æpyornis maxima*; and he in September read a communication on it to the French Academy, displaying at the same time fresh fragments of eggs, which he had himself dug up at Capé Sainte Marie in Southern Madagascar, as shown in the map which he has drawn and sent me, along with some of the same fragments and his article upon them. I now have the satisfaction of placing these before you. They are nine in number, one having been apparently broken in coming. It is to this broken portion to which I wish to direct your attention. The granulation is, in a marked degree, different from that of the other pieces; the difference may easily be seen by the eye alone, and is still more apparent through a magnifier. The air-pores, which in the other specimens seem much like a comet with a tail, are here only small indentations without any tail; the shell also is only half the thickness, is much finer, and presents an aspect so diverse that the difference is detected by the most careless observer, even when the pieces are all mixed. These fragments belonged to the egg of a much smaller bird, the embryo of which required less strength in the shell. Yet the colour, quality, and locality of that shell clearly point to a bird of the same family as *Æpyornis maxima*—in short, a smaller and more delicate *Æpyornis*. For this species I propose the name *Æpyornis grandidieri*.

The number of eggs of *Æpyornis* discovered up to this time I take to be as follows:—Four in the museum of the Jardin des Plantes, of which I exhibit casts of the two first found, sent me by M. E. Verreaux, and also casts of the three portions of bone discovered with them. Two more eggs were shown by M. C. Talavande in the Venezuelan department of the Paris exhibition, both with very large holes, having probably been used by the natives for holding water. I took their dimensions, which are as follows:—No. 1, great circumference  $33\frac{2}{8}$  inches, small circumference  $29\frac{2}{8}$  inches; this egg was

cracked, but with the granulation and the surface perfect. No. 2 measured  $33\frac{3}{8}$  and  $28\frac{3}{8}$  inches respectively; the surface was not so well preserved. I regret that I can give no history of these. I offered to purchase them, and am now informed that I may have both for the small sum of £320, or one for £200!

The 'Journal de Toulouse' states that M. Nau, who had been thirteen years a prisoner among the Hovas, has brought to Toulouse a specimen with diameters 12 inches and 10 inches, found in a recent alluvial deposit at a depth of  $4\frac{1}{2}$  feet. This one I have not seen. I believe it to be different from one mentioned to me in a letter by Count Raoul de Baracé, at Nantes. M. Grandidier speaks of one or two other eggs in a letter I have just received from him, making ten or twelve in all. I am bound also to state that he doubts any having been found except at Cape St. Marie, the village of Ampalaze and Machichora, all in close proximity on the shore of South Madagascar. To his opinion I attach the greatest weight. It is therefore quite possible that the statement I received in French, naming Mananzari as one locality, may be founded upon an error. M. Grandidier's letter goes on to say, "All the southern tract, where these ports are, is only a plateau without the smallest hill, without a ravine, without a cave, where one digs in a bed of sand as smooth as the surface of the table." The eggs have been found "in the places I mention, only on the sea-shore, on the abrupt rise of the dunes, even on the surface of the sand, when there is a crumbling of the earth, or when tropical rains heave up parts of the sand." He has deposited in the museum the following specimens of the strata:—"No. 1. Un calcaire quaternaire, which does not rise above the sea-level, and serves as a base to the dunes. To this calcareous stratum are joined specimens of modern breccia. No. 2. Sand of the dunes, composed of impalpable fragments, shells, and grains of quartz. No. 3. Land-shells, which are found along with the remains of the eggs of *Æpyornis*. No. 4. Fragments of calcareous rolled stones mixed with shells. All the subfossil shells that are mixed up with the remains of eggs would probably be still found alive, and are land-shells. For fossils I have tried without hope of success, and I do not think any further efforts can be made." In my first paper I located the *Æpyornis* in modern times; and each new discovery confirms the idea. There is every reason to believe, from M. Grandidier's account, that it was extant in or about Flacourt's period, *i. e.* 1658. All the eggs found have been taken from recent strata, modern alluvia—whole ones deeper, and fragments on the surface, the latter in great abundance, showing that these *Æpyornithes* were by no means uncommon. M. Grandidier says that the recent stratum in which he found his remains contained also land-shells, which partially retain their colour and still exist in Madagascar. M. Grandidier concludes his most interesting paper thus:—"I am led to acknowledge that this gigantic bird was living at a recent period, since its remains are found in the most modern formations, the deposition of which is still in progress. Possibly it existed at the beginning of our era; but when the country was peopled it became speedily exter-



minated, as in the case of the Moa (*Dinornis giganteus*) in New Zealand."

It is true that the pieces themselves present a subfossil appearance; but this condition by no means indicates antiquity in all cases. I know a spring in the Isle of Wight which quickly gives any object a lithological aspect; and many others there are of the same kind. One thing is certain, the bird does not exist now. M. Grandidier is positive on this head. One most singular circumstance is, that all the seven eggs which I have seen (and I suppose it is the same with the others) were never hatched. I can only account for this on the supposition of their being what the Bechuanas of Africa call (in the case of the Ostrich) "Lesetla," and the Spaniards of South America (in that of the Rhea) "Nuachos," viz. solitary and abandoned eggs. This habit of the *Struthionidæ* has not been assigned to any satisfactory reason. The *Æpyornithidæ* may have had the same propensity. As regards the size of the largest *Æpyornis* and *Dinornis*, if we compare the dimensions of the *Æpyornis* egg and that of an Ostrich, (I quote a writer in the 'Field') "bearing in mind that similar solids are to each other in the triplicate ratio of their dimensions, we see that if the egg of the Ostrich measures  $6\frac{1}{8}$  inches and that of *Æpyornis*  $12\frac{1}{4}$  inches in the direction of their major axes, the size of the latter as compared with the former is  $(6\frac{1}{8})^3 : (12\frac{1}{4})^3 :: 1 : 8$ ."

In certain cases, I admit, the height and bulk of the bird is not proportioned to the size of the egg. In two very different species (*Cuculus canorus* and *Apteryx mantelli*) they are not so. These are, however, special adaptations of nature, for purposes of her own, which are apparent to every one. In *Cuculus* the egg has to be hatched by a very small bird. In *Apteryx* it is necessary to retain the embryo long, as its apterous and defenceless condition requires it to be strong enough to escape danger at once.

I confidently affirm it to be axiomatic to ornithologists, that *large eggs produce large birds*.

But here Professor Owen steps in and takes us out of the region of Oology into the sober scene of comparative anatomy. He compared the dimensions of the portions of the right and left metatarsal with the corresponding ones of the *Dinornis*, and at the same time the fragment of the fibula (casts of these are now before you), and he justly admits that it is hazardous to judge of the entire length of the metatarsus from the breadth of the distal end. Strickland observes, in his work upon the Dodo, "No argument as to the general affinities of a doubtful ornithic genus can be drawn from the relative proportions of the tarso-metatarsal, the posterior metatarsal, and the proximal phalanx; these proportions vary in each genus according as its habits are more or less cursorial, ambulatory, or insessorial." I have not gone over Professor Owen's measurements; they are, no doubt, correct; and he says the fibula of *Æpyornis* is smaller than that of *Dinornis*, indicating a smaller leg-bone than the latter. This is so. But more ample experience of these eggs leads me to suppose that there were not only two species of *Æpyornithidæ*, but several;

and to which of them the bones belonged, who shall say? The full-sized specimen of *Dinornis* has been selected for comparison; and if, as would certainly appear, the bones might have belonged to a smaller bird, I contend that they are not those of the bird which laid an egg eight times the volume of that of the Ostrich, but some smaller species of *Aepyornis*; it may be of *Aepyornis grandidieri*, or another. We ought to bear in mind that these osseous remains and the eggs bear indications of disturbance, and therefore it is probable of mixture of species. No authenticated egg of *Dinornis giganteus* has yet been discovered; those put forward as such may belong to some of the smaller kinds of that bird, or may not. We have no certain knowledge to go upon, and I have made no scientific examination of any.

2. Descriptions of a New Genus and a New Species of Macrurous Decapod Crustaceans belonging to the *Penæidæ*, discovered at Madcira. By JAMES YATE JOHNSON, C.M.Z.S.

One of the two forms of Crustaceans I am about to describe belongs to the genus *Penæus*; whilst the other, though closely allied to that genus, is so remarkable for the peculiar structure of the mandibles, that I propose to make it the type of a new genus named *Funchalia*. In the normal species of *Penæus* the jaws compose a combined cutting- and crushing-apparatus, each having externally an acute edge with teeth; whilst outside the mouth the jaws are so formed as to constitute a tuberculated implement for breaking or pulping by pressure any substance introduced between them. But in the crustacean on which the new genus is founded the jaws are represented by a pair of long sickle-shaped shears, which cross each other from opposite sides of the mouth.

*FUNCHALIA* WOODWARDI, gen. et sp. n., ♀.

Colour a uniform red. Carapace compressed and studded with minute warts, which bear short downy hairs. A median crest commences near the posterior border, and projects in front as a rostrum. The surface of the carapace is unarmed; but there is a blunt tooth at the outer side of the ocular excavation, and another at each anterior lateral angle of the carapace, each of these teeth being the termination of a crest or ridge, the upper one of which, after bending so as to form an elbow at a point which is a little in advance of the middle of its course, runs backwards to the posterior border of the carapace. Eyes —? The basal joint of the superior antennæ is excavated for the reception of the eyes; and the inner border of the excavation carries a lamellar-fringed appendage; whilst the outer border is beset with long hairs, and terminates in a weak acute tooth. The second joint is trigonous and shorter than the first, but longer

than the third, which is cylindrical. Filaments —? The cylindrical peduncle of the inferior antennæ does not extend quite so far as the basal joint of the superior antennæ. It carries a single filament. The lamellar palp is narrowly oval, and reaches beyond the peduncle of the superior antennæ. Its upper surface is marked by a deep longitudinal groove. The basal joint is unarmed.

The external jaw-feet are pediform and slender. They extend beyond the peduncle of the inferior antennæ, but not so far as the distal extremity of the superior antennæ. They are furnished with a many-jointed palp as long as the feet, fringed with hair on both edges. The second joint has a sharp exposed edge; and the lamellar appendage attached to the basal joint is bifid and similar to the appendages of the ambulatory legs. The next pair of jaw-feet are flattened, and are much shorter than either the external pair or their own palps, which are not quite so long as the palps of the external pair. The three remaining pairs of jaw-feet are elongate, imperfectly divided into joints and very thin. The mouth is destitute of the powerful cutting- and crushing-jaws which characterize the species of the genus *Penæus*; but it is furnished with a pair of long sickle-like shears, which cross each other from opposite sides. At each side of the mouth there is a broad lamellar appendage.

None of the ambulatory legs is multiarticulate. They are slender, and the order of their length is 4, 3, 5, 2, 1, the fourth pair being the longest. The legs of the three anterior pairs are didactyle; and at the base of each of these legs there is a lamellar bifid fringed appendage. The legs of the two anterior pairs carry a spine at the distal extremity and at the underside of the second and third joints. The other legs are unarmed, but have hairs on the undersides or edges of their joints. The legs of the third pair extend the furthest forward, but they do not reach so far as the distal extremity of the peduncle of the inferior antennæ. The orifices of the oviducts are on tubercles upon the inner side of the basal joint of these legs. The sternum is very narrow, and has a protuberance between each of the fourth and fifth pairs of legs.

The unarmed abdomen is compressed and clothed with short hairs on the less exposed parts. The sides are corrugated and project over the bases of the false feet. The first segment is the highest, the sixth the longest. A low median crest commences on the third, and is continued on the fourth, fifth, and sixth segments. At the sides of the anterior five segments there are ridges of irregular form. On the sixth there are four straight longitudinal ridges in addition to the median crest. At each side of the posterior margin of the sixth segment there is a small projecting lobe, and a small tooth is seen at each posterior angle. To the anterior five segments are attached well-developed false feet with stout peduncles, bearing (except in the case of the first pair) two many-jointed fringed palps, the outer one being the longer. The false feet of the first pair have only one palp that does not extend beyond the middle of the carapace. The second, third, and fourth pairs of false feet are longer than the first. The seventh abdominal segment, or middle caudal

plate, is shorter than either the sixth segment or the lateral swimming-plates. It is narrow and pointed, furnished with a deep longitudinal groove on its upper surface and a small marginal tooth at each edge, nearer the base than the posterior extremity. The lateral swimming-plates are narrowly oval, and those of the inner pair are marked on their upper surfaces by two longitudinal ridges, those of the outer pair by four similar ridges. There is a tooth at the outer side of the latter pair of plates, not far from the posterior extremity.

The imperfect condition of the single individual obtained prevents me describing the rostrum, the eyes, and the filaments of both pairs of antennæ. It may be stated, however, that the rostrum appears to have carried a crest at each side, that the longer filament of the superior antennæ is thickened at the base and setiform above, whilst the shorter filament of these antennæ is setiform throughout, and that the filament of the inferior antennæ is compressed below. It may be further stated that the median carapacial crest appears to have carried a small tooth at a point distant about three-tenths of the length of the carapace from the anterior border.

The species is named in compliment to my friend Mr. Henry Woodward of the British Museum, well known for his labours amongst fossil crustacea.

The following are the dimensions of the specimen, which is now in the British Museum:—

	inches.
Total length from anterior border of carapace to end of caudal plates .....	$6\frac{1}{2}$
Carapace, length of side .....	$2\frac{1}{2}$
——, height .....	1
——, thickness .....	$\frac{3}{4}$
Lamellar palp of inferior antennæ .....	$1\frac{1}{8}$
Jaw-feet, length of external pair .....	$1\frac{1}{2}$
Ambulatory legs, length of fourth pair .....	$1\frac{1}{4}$
—— —, length of third pair .....	$1\frac{1}{8}$
—— —, length of first pair .....	$1\frac{1}{8}$
False feet, length of second, third, and fourth pairs ..	$1\frac{3}{8}$

*PENÆUS EDWARDSIANUS*, sp. n., ♀.

Colour a brilliant crimson, with an obscure fuscous cross band on the hinder part of the carapace and on each abdominal segment. Carapace somewhat compressed, shining, hairless, its surface unarmed, with a low obtuse median crest commencing near the posterior border. This crest rises gradually, and projects in front as the rostrum, which is long, pointed, compressed, rather slender, and curved obliquely upwards for its anterior half. At each side of its basal portion there is a rounded crest. It extends beyond the peduncles of both pairs of antennæ, and beyond the lamellar palp of the superior antennæ; but it is considerably shorter than the carapace. It carries two small teeth—one a little in advance of its base, and a second further in front, separated from the first by a distance equal to one-fourth of the length of the rostrum. About the same



distance behind the posterior rostral tooth there is a tooth on the median crest of the carapace. The under edge of the rostrum is destitute of teeth. There is a fringe of hair in the neighbourhood of the rostral teeth, and on the under edge of the rostrum as far as the upper fringe extends. At the front border of the carapace there are four small teeth—one over the exterior base of each of the superior antennæ, and one over the base of each of the inferior antennæ. Each of these teeth forms the termination of a ridge; and of these ridges the two nearer the lateral margins of the carapace are higher and longer than the other two. About the middle of the height of the carapace there is another ridge on each side, but it does not extend backwards beyond the middle of the length of the carapace. Between the two principal ridges the carapace is concave; and there is a furrow on the upperside of the exterior ridges; these furrows extend backwards to about the middle of the length of the carapace, and they then bend obliquely downwards towards the lateral borders. At the bend another furrow commences, which widens backwards and upwards until it reaches nearly to the posterior border of the carapace. An intramarginal furrow extends round the carapace, except in front; and the sides have a broad membranous border.

The eyes are black, round, large, and of greater diameter than the stalk. The eye and stalk together are less than half as long as the peduncle of the superior antennæ, and do not reach so far as the base of the filament of the inferior antennæ.

The basal joint of the superior antennæ is excavated to receive the eye; there is a blunt recumbent tooth on the external edge of the excavation, near the base, and a second tooth, which is sharp, near the distal extremity; the inner edge is thickly set with hair, and bears a small tooth near the base. The third joint is shorter than the second, which is cylindrical, and the second than the first. The lower of the two filaments is very long, being about equal to the total length of the animal; whilst the other is compressed and very short, being much shorter than the carapace. The peduncle of the inferior antennæ is cylindrical; and its single filament is slender and very long, being much longer than the animal. The antennal scale or lamellar palp extends beyond the peduncle of the superior antennæ; on its upper face there is a deep longitudinal groove near the outer margin, and a small tooth on the outer border near the extremity; the inner border is fringed with hair. The joint to which this scale is attached is stout, and carries a strong tooth on its under-side.

The external jaw-feet are large and pediform; they are more than twice as long as the multiarticulate ciliate palp, and they reach to the distal extremity of the lamellar palp of the inferior antennæ. The next pair of jaw-feet are much shorter, and are only half as long as their very elongate multiarticulate ciliate palps. The third joint of these jaw-feet is much compressed and broad. Each of the jaw-feet of the two outer pairs is furnished with a ciliate lamellar appendage at the base; the remaining three pairs of jaw-feet are short, and are furnished with several lamellar appendages.



The jaws are powerful, each consisting of an external cutting edge and a tuberculated crushing-apparatus inside. On the upperside of the mouth there is a large membranous lip.

The sternum is very narrow, and between each of the fourth and fifth pairs of legs there is a large transverse deltoid tooth. All the ambulatory legs are slender and unarmed, except by their terminating nails; the order of their length is 3, 5, 4, 2, 1, those of the third pair being the longest. The legs of the three anterior pairs are didactyle, with smooth hands and slender fingers. On the underside of the first pair of legs are some long bristly hairs. The two posterior pairs are monodactyle. None of the members are multiarticulate. To the basal joint of all except those of the last pair is attached a lamellar appendage, which lodges under the carapace.

The abdomen is hairless, shining, sparsely puncturate, subcompressed in front, much compressed behind; the sides of the segments project over the bases of the false feet. On the third segment commences a low median crest, which becomes more and more conspicuous on the posterior segments; and this crest projects a small tooth at the posterior border of the third, fourth, fifth, and sixth segments. The three anterior segments are marked by a deep transverse groove in their anterior halves; and there is a small notch at each side of the posterior border of the first, second, fourth, and fifth segments, whilst at the same place on the sixth there is a large rounded lobe. A small tooth is seen at the posterior angles of the segments from the second to the sixth inclusive. The false feet of the five anterior segments are well developed; their peduncles are stout; and all (except in the case of the first) carry two many-jointed ciliate palpi, one of which is much longer than the other. The single palp of the first pair of false feet is longer than the other palps. The inferior surface of the abdomen is covered with membrane. Between the bases of the first three pairs of false feet there is a deltoid process terminating in a tooth. The middle caudal plate or seventh abdominal segment is narrow, and terminates in a spine; its sinuous borders are fringed with hair. The middle of the upper surface is depressed, and the sides are marked by two low ridges. The lateral swimming-plates are narrowly oval, and extend beyond the middle plate; those of the outer pair are fringed with hair on the inner edge, whilst the upper surface is marked with two longitudinal furrows near the outer margin, and there is a small spine on the outer edge near the extremity. The inner pair of plates are fringed with hair on both edges. At the middle of the upper surface there are three longitudinal furrows.

A single specimen of this fine crustacean, the largest and handsomest of its genus, was obtained at Madeira, where it appears to be of rare occurrence; but in the fish-market of Algiers I have frequently seen considerable quantities of a red *Penæus* which, after careful examination, I do not hesitate to assign to the same species, notwithstanding a few differences of minor importance.

The species is dedicated to Dr. Alphonse Milne-Edwards, of the Jardin des Plantes, Paris, the son of the celebrated author of the 'Histoire Naturelle des Crustacées,' and himself the author of several valuable contributions to carcinological science.

The following dimensions were afforded by the Madeiran specimen, which has been added to the collection of the British Museum:—

	inches.
Length from tip of rostrum to end of caudal plates .	$13\frac{1}{4}$
——— of rostrum . . . . .	$2\frac{1}{8}$
Carapace, length from base of rostrum to middle of posterior margin . . . . .	$3\frac{7}{8}$
———, width near the middle . . . . .	$1\frac{1}{2}$
———, height . . . . .	$1\frac{3}{8}$
Eyes with their stalks, length . . . . .	$1\frac{3}{8}$
Superior antennæ, length of peduncle . . . . .	$1\frac{3}{4}$
Inferior antennæ, length of lamellar palp . . . . .	$1\frac{1}{4}$
———, width . . . . .	$\frac{3}{4}$
Jaw-feet, length of external pair . . . . .	4
———, length of next pair . . . . .	$2\frac{1}{4}$
Legs, length of first pair . . . . .	$2\frac{3}{4}$
———, length of third pair . . . . .	$5\frac{1}{8}$
———, length of hand and fingers of third pair . . . . .	$1\frac{1}{4}$
Abdomen, length to end of caudal segment . . . . .	$6\frac{1}{2}$
False legs, length of first pair . . . . .	$4\frac{1}{4}$
———, length of last pair . . . . .	$2\frac{3}{8}$
Middle caudal segment, length . . . . .	$1\frac{1}{2}$

*PENÆUS BOCAGEI*, mihi, P. Z. S. 1863, p. 255.

I will take this opportunity of stating that the *Penæus* of the *Tagus*, described by me under the name of *P. bocagei*, is identical with the *P. longirostris* of M. Lucas (Exploration Scientifique de l'Algérie: Crustacées, p. 46, Atlas, pl. 4. f. 5), as I have ascertained by an examination of specimens obtained at Algiers, and by a study of M. Lucas's description. Dr. Camil Heller (Die Crustaceen der südlichen Europa) is of opinion that *P. longirostris* is itself identical with *P. membranaceus*, Risso, and thinks that Dr. Milne-Edwards, in his 'Histoire Naturelle des Crustacées,' vol. ii. p. 417, has inadvertently attributed to the *P. membranaceus* of Risso some of the characters of *P. siphonocerus*, Philippi (Archiv der Naturgeschichte, 1840, p. 19, t. 14. f. 3), which has a very short rostrum, whilst the true *P. membranaceus* has a long one. If Dr. Heller's views are correct (and I have no reason to suppose that they are not), it will be seen that the range of *P. membranaceus*, Risso (not Milne-Edwards), is not, as has been hitherto believed, limited to the Mediterranean.

It may be useful to point out how the five known species of Mediterranean *Penæi* may be distinguished from one another by means of their rostra.

- A. Rostrum shorter than peduncle of superior antennæ  
(six teeth on upper edge) ..... *P. siphonocerus*, Phil.
- B. Rostrum longer than peduncle of superior antennæ,  
but shorter than carapace.
- a. Teeth on the under edge (filaments of superior antennæ shorter than peduncle)... *P. caramote*, auct.
- b. No teeth on the under edge.
- \* Three teeth on upper edge, including carapacial crest (no spines on surface of carapace) ..... *P. edwardsianus*, J. Y. J.
- \*\* Nine teeth on upper edge, including carapacial crest (four spines on surface of carapace, two on each side) ..... *P. membranaceus*, Risso.
- C. Rostrum equal to carapace in length ..... *P. foliaceus*, Risso.

### 3. On *Hyalonema lusitanicum*.

By J. S. BOWERBANK, LL.D., F.R.S., F.Z.S. &c.

On January 24th, 1867, Dr. Gray read a paper at the Zoological Society entitled "Notes on *Hyalonema lusitanicum*, and on the Genus in general," announcing that Prof. Bocage had presented to the British Museum a specimen of the above-named species. The author adds, "I am enabled to state that I believe it to be a most distinct species from the *Hyalonema sieboldii* of Japan," or, in other words, from the species he formerly described as *H. mirabilis*, the structural specific differences said by the author to exist between the two species consisting of differences in the number of spicula in the spiral axis, and their diameter as compared with each other in the respective species; but as these differences in length, number, and diameter of the spicula exist to a very great extent between young and old specimens of *H. mirabile*, such characters cannot certainly be admitted as specific distinctions. His observations on the size and form of the so-called polypes are equally vague and uncertain; and the varieties in structure cited may be as readily found in different specimens of *H. mirabile* as in Prof. Bocage's specimen of *H. lusitanicum*.

There is an aphorism in natural history that no two individuals of the same species are ever exactly alike; and this observation applies with greater force to the protean forms of the *Spongiadae* than to any other class of animals existing. If the author had but carefully studied the axial columns of the numerous specimens of *H. mirabile* in his possession, he could not but have rejected such very uncertain characters as those he has adopted. The above are the only organic characters cited by the author in behalf of his opinions; and he then takes flight into the realms of imagination in support of his purely speculative ideas on the structure and habits of the interesting animal under consideration.

Sterne took his hypothetical prisoner and shut him up in a dungeon, and then described all his imaginary woes and sufferings most pathetically; so the Doctor took his *Hyalonema*, denuded him of

the most important portion of his body, his basal spongy mass, turned him upside down, so that his so-called polypes were situated at his supposed base, instead of at the upper part of his spiral column, and then turned him adrift a denizen of the wide ocean. With this imaginary constitution the poor animal could no longer be considered a *Hyalonema*; but this difficulty was readily to be got over, and the Doctor, with his usual facility in such operations, soon devised a new genus, founded on the imaginary characters he had himself created, which he has denominated *Hyalothrix*, and which he thus characterizes:—

“The polypes with forty tentacles in several concentric series, the outer series the largest. The axis, covered to the very base with the polype, bearing bark strengthened with cylindrical filiform siliceous spicules, and with a smooth external coat without any imbedded granules.”

Having thus imagined his animal, and fitted him with a new genus, the Doctor, with an artless simplicity that is really very charming, observes, “This genus is at once distinguished from *Hyalonema* by the coral not living with its base immersed in a sponge. It lives evidently free; but how it keeps itself in an erect position so that all the polypes round the axis may obtain food is yet to be discovered.”

But alas for the stability of this ingenious natural-history romance! The irresistible logic of facts has destroyed the whole edifice; for scarcely could the ink have dried with which Dr. Gray's imaginations were printed before Prof. Bocage announced that he had at last obtained a specimen of his *H. lusitanicum* with the basal sponge embracing the proximal uncovered end of the spiral column in the same manner as in the Japanese specimens. All reasoning upon Dr. Gray's imaginary animal now becomes superfluous, and we have only to deal with Prof. Bocage's specimens of *Hyalonema lusitanicum*.

Shortly after I had learned from Dr. Gray that Prof. Bocage had acquired a specimen of his species with the basal sponge adhering to it, I wrote to him on the subject, enclosing a small portion of the spongy base of my specimen of *H. mirabile*, figured in the ‘Proceedings of the Zoological Society,’ Part 1, Pl. IV. f. 2, for the year 1867, that he might compare its organic structures with those of the basal sponge of his *H. lusitanicum*, and begging the favour of a small portion of the basal sponge of his specimen. To this request he replied with much kindness and liberality, enclosing a piece of the sponge 4 lines in length by about 3 in width—a quantity, as it will be seen, amply sufficient to demonstrate accurately the structural characters and relations of the two species. The fragment of sponge is apparently from the surface of the specimen, as it is enveloped in the remains of a rather stout brown membrane. After examining the specimen in water, I disintegrated about half of it, and mounted the spicula in Canada balsam, and then mounted the remaining portion in the same material, in the state in which I had received it. The results of my examinations of it were most satisfactory. In the



piece mounted in its natural state the structure of the skeleton was distinctly exhibited, exactly resembling, in the forms of its component spicula and in the mode of their arrangement, those of the skeleton of the spongy base of *H. mirabile*. In the disintegrated portion I found no less than eight forms of spicula which exist in the basal sponge of *H. mirabile*, and which I have figured in the plates illustrating my paper on that species (Proc. Zool. Soc. 1867, p. 18). The spicula found were those represented in Plate V. by figures 2, 4, 6, 7, 8, 9, 18, and those of the skeleton. The only difference between the forms of spicula found in Prof. Bocage's specimen and those from *H. mirabile* is that those of the former are rather more slender in their proportions, indicating a young and not fully developed state of its organization.

The skeleton-spicula of *H. lusitanicum* are of about the same length as those of *H. mirabile*, but somewhat less in their diameter, and they have the same malformations of their apices that so commonly occur in those of the last-named species. In truth, the spicula of *H. lusitanicum* are so identical in form with those of *H. mirabile* that, without knowing whence they came, it would be impossible for an observer to say from which species they had been obtained. With these slight differences in the organization of the two specimens under consideration, there is little doubt in my own mind that they belong to one and the same species; and the slight discrepancies now apparent in the structure of *H. lusitanicum* will probably disappear when other perfect and more fully developed specimens are hereafter obtained and compared with *H. mirabile*; and in the consideration of these slight differences of structure the influence of their widely separated localities must also be taken into consideration.

Another strong argument against *H. lusitanicum* being a species distinct from *H. mirabile* is, that no form of spiculum can be detected in the spongy base of the former that is not abundantly present in the corresponding parts of the latter. As regards organic structure, there is no true specific distinction existing between them. Their differences amount only to those of development and such as may naturally arise from variations in climate and locality.

I have seen the specimen of *Hyalonema lusitanicum* in the British Museum that was presented by Prof. Bocage, through the sides of the glass tube in which it is carefully preserved. It is  $21\frac{1}{4}$  inches long, and has 10 inches of the distal portion of the column covered with corium. The specimen is about  $2\frac{1}{2}$  lines in diameter. There is the same paucity of sand in the crust that is observable in Mr. Lee's specimen, described by me in the Society's 'Proceedings' (1867, p. 350); and, as in that case, each osculum is situated in an elongate-oval area, in which, by the aid of a lens of 2 inches focus, the radiating fibres are readily to be seen. The oscula are none of them elevated to the same extent as in the Japanese specimens, but, like those in Mr. Lee's one, they project very slightly. The oval areas do not all coalesce at their respective boundaries; in some there is a small space of smooth corium separating them from each other.

Having disposed of his new genus *Hyalothrix*, Dr. Gray proceeds



to reiterate his belief that "*Hyalonema* is a type of a peculiar family of Corals, formed by zoanthoid polypes, characterized by forming for their support a siliceous axis formed of many thread-like spicules coiled together into a rope-like form, each formed of numerous concentric laminae, and surrounded and separated from one another by the corium of the community of polypes." I should not have noticed this reassertion of his opinions if he had not endeavoured to establish certain laws which are in themselves essentially false, and on which he bases his reasonings in favour of his own theory. In the first of these Dr. Gray asserts, "Silica is not exclusively secreted by sponges, as the advocates of the sponge-theory seem to believe, but is found mixed with corneous matter (as it is mixed in *Hyalonema* and *Euplectella*) in *Gorgonia* and *Antipathes*, and with calcareous matter in *Madrepores*."

In the first place, no one, to my knowledge, has ever asserted that silica is exclusively secreted by sponges; nor is the silica to be obtained from Corals and Gorgonias in the same state as it is in *Hyalonema* and *Euplectella*. In the former two it has never been discovered in an organized condition, while in the latter two it is always in that state.

Dr. Gray quotes the analysis by Mr. Children of *Gorgonia flabellum*, in which he found silica enough to form "a globule before the blowpipe;" and the Doctor says, "This proves that silica is found in the coral of *Aleyonaria* or polypes with pinnate tentacles."

But the results of this analysis by Mr. Children do not bear effectively on the point in dispute, which is whether polype-bearing animals secrete silex as well as carbonate of lime in an organized form as portions of their bony skeletons. There is no doubt that corals, Gorgonias, and zoophytes living in waters continually charged with minute grains of sand and with silex in solution would receive and retain within their fine pores numerous grains of that substance which would only be liberated and recognized by the chemical dissolution of those bodies. But this adventitious acquisition of silex by creatures whose organic structures are essentially calcareous is no proof of their power to secrete and organize silex as well as carbonate of lime; and Dr. Gray does not produce a single example of any polypiferous animal, either among the bony corals, the Gorgoniadæ, or zoophytes, secreting and organizing silex as part of their skeleton-structure. The difficulty of the purely siliceous structure of all parts of the skeleton and internal siliceous organs of *Hyalonema*, considered by Dr. Gray a coral, still remains to be solved by him; and among all the beautiful siliceous organized forms so familiar to microscopists of the present day there is not one that can be assigned to any polype-bearing animal, described or undescribed; and I believe that the animal power of organizing siliceous matter to form either an internal or an external skeleton will be found to be strictly confined to the great subkingdom of the Protozoa.

The second law that Dr. Gray enunciates is, "The structure of the siliceous spicules of sponges is very similar to, almost identical with, the structure of the axis of *Gorgonia* among the sclerobasic

alcyonoid, and of *Antipathes* among the sclerobasic zoanthoid polypes."

The fact of the general law of increment by means of concentric layers being common to the spicula and fibres of sponges and to the horny axes of the *Gorgoniadæ*, upon which the author lays so much stress, no more proves their relationship to each other than it would to the trees and herbs of the vegetable kingdom, or to the bones of the mammalia; and the reasonings deduced from this aphorism are so inconsequential as to render it quite unnecessary to pursue this portion of the subject any further.

The third position assumed by the author is, that "The spicules of sponges are only covered with sarcode; while the spicules of the *Hyalonema* are each surrounded by a layer of corium exactly like the inner surface of the bark or corium of the polypes."

The law thus attempted to be laid down is essentially incorrect, and could never have been enunciated by any one even moderately acquainted with the anatomy and physiology of the *Spongiadæ*. In all Halichondroid sponges, where the spicula are connected with each other the junctions are formed not by sarcode, but by masses of keratode closely enveloping the adjoining points of the spicula, much after the fashion of a plumber's joint; and in some genera, as in *Chalina*, the spicula are entirely immersed in the keratose fibres of the sponge, as represented in figures 262 and 263, pl. 13, vol. i. of 'Monograph of the British Spongiadæ.' The same structure obtains in the genus *Diplodemia*, as represented in pl. 14. f. 273, and also in the genera *Desmacidon* and *Raphyrus*, represented by figs. 264 and 265, pl. 13, of the same work. The premises attempted to be established by the author thus being proved to be essentially false, it is unnecessary to follow him through the series of reasonings which he has based upon them.

The fourth position assumed by the author is, that "The essential character of a sponge is, that it is permeated by canals for the circulation of the water, which is emitted by oscules; and there is no such structure in *Hyalonema*."

This law, as far as it concerns the structure of a sponge, is correct; but as regards the assertion that "there is no such structure in *Hyalonema*," I must leave my readers who are acquainted with the papers of Professors Brandt and Max Schultze and myself to form their own opinions on the subject.

The author's fifth law is, that "The attachment to the sponge appears to be the habit of a single species; for the Portuguese species, which agrees with the Japanese in most of its essential characters, lives free in the sea, and has the small end of the coral, which in the Japan species is sunk in the sponge, covered with polypes like the rest of the surface."

This position, after our knowledge of the acquirement by Prof. Bodge of a specimen of his *H. lusitanicum* with the basal mass of sponge attached to it, is effectually negated by the inexorable logic of facts.

Dr. Gray, in his paper on "*Hyalonema lusitanicum*," read January PROC. ZOOL. SOC.—1867, No. LVIII.

24th, dismisses the consideration of my paper on "*Hyalonema mirabilis*," read on the 10th of January, in not the most courteous style imaginable. In a short note to his paper (p. 120) he observes, "Dr. Bowerbank has written a long and diffuse paper to attempt to prove his position, when a cut in the polype-cell would have settled the question. It is a pity he did not recollect King Charles's question about the fish and the water." This style of pooh-poohing disputed facts in natural history is neither just nor gentlemanly, and in the present case it is at variance with the truth. Dr. Gray was invited by me to be present at the reading of the paper on the 10th of January, but he declined to appear on that occasion. Had he been there he would have known that I had, not once only, but repeatedly, cut into his supposed polype-cells, and that the results of their examinations were duly described and their anatomical peculiarities figured in illustration of the descriptions of them. Neither then, nor since, has Dr. Gray attempted to disprove a single fact advanced by me in that paper.

In conclusion I may observe that, since the reading of a short supplemental paper on March 28th, entitled "Additional Observations on *Hyalonema mirabile*," I have been fortunate in obtaining from Mr. Jonathan Couch, of Polperro, several dried specimens of *Zoanthus couchii*, in which the polypes were living when dredged up at Shetland, and in which the motive fibres passing from the polypes have their distal extremities attached in a circle to the inner surface of the polype-case of the animal. The terminal portions of these fibres have a stout, dilated-cylindrical, and very fleshy appearance. They are attached to the inner surface of the mouth of the polypidom by their apices only; and from these points they pass inward to the upper part of the polype to which their bases are attached, and down the sides of which each of them may be traced for a considerable distance, gradually diminishing in diameter as they pass downward on the body of the animal.

As the end to be attained by means of these organs, in both *Zoanthus* and *Hyalonema*, is precisely the same, that of opening and closing a purse-like orifice on the apex of a cylindrical tube, Nature, as might have been expected, has adopted nearly the same mode of action in either case—that of a series of motive fibres, the distal ends of which are attached in a circle around the orifice to be contracted; and there is just that difference in their structure and mode of disposition that is appropriate to the conditions of each separate animal.

In *Hyalonema*, destitute of polypes, they are imbedded between the outer and inner tissues of the corium of the organ on which they are destined to operate; while in *Zoanthus* they are not immersed in the tissues of the case or polypidom of the animal, but are parts of the enclosed polype within it, and their distal ends only are attached to the oral opening of the external case, while the remaining portions of these organs are attached to the outer integument of the retractile polype within the polypidom.

These organs in *Zoanthus* are few in number, and very much

stouter than those of *Hyalonema*. No tentacles of the *Zoanthus* could be detected, the skin of the polype and the motive organs only remaining within the polypidom in a favourable condition for observation.

4. Description of a New Species of Land-shell belonging to the Genus *Cœliaxis*, H. Ad. and Angas. By H. ADAMS, F.L.S., and G. F. ANGAS, F.L.S., C.M.Z.S.

(Plate XLIII.)

In a paper read at the Meeting of the Society on the 10th January, 1865, we gave a description of a new species of Land-shell from the Cape of Good Hope, for which the subgeneric name *Cœliaxis* was proposed. Adult specimens of a second species, possessing a continuous peritreme and distinct parietal plate, have since been received by us from the Solomon archipelago, from which it would appear that *Cœliaxis* must be considered a distinct genus, having more affinity with *Gibbulina* and *Ennea* than with *Subulina*, to which we at the time referred it. Of the species upon which *Cœliaxis* was founded, only two examples, in the British Museum Collection, have the apertures at all complete. In one of these there is no trace of any parietal plate; while in the other, which is rather more mature, a callosity or tubercle, considered at the time accidental, exists, thus rendering it probable that in quite mature examples of this species the parietal plate will also be found distinctly developed, and the peritreme of the aperture continuous.

Genus CÆLIAXIS, nob. (char. emend.).

*Testa umbilicata, turrita, oblique costulata; spira plerumque decollata; apertura plica parietali vel tuberculo munita; perist. continuum, simplex, rectum.*

CÆLIAXIS EXIGUA, nob. (Pl. XLIII. figs. 16, 17, p. 890.)

*C. testa anguste et profunde umbilicata, cylindraceo-turrita, tenui, oblique costulato-striata, pallide fulva; spira decollata, superne attenuata; anfr. superst. 11, sulplanatis, ultimo costa basali sulcum interiorem angustum formante; apertura subverticali, rhomboidea, plica parietali spirali in medio posita; perist. simplici, continuo, soluto, margine columellari expanso.*

Long. 17 mill., diam. 4 mill., ap. 4 mill. longa.

*Hab.* Solomon archipelago.

5. On a New Genus and some New Species of Marine Mollusca from Port Jackson, New South Wales. By GEORGE FRENCH ANGAS, F.L.S., C.M.Z.S. &c.

(Plate XLIV.)

Genus ALICIA, Angas.

Shell inequivalve, transversely ovate, thin, slightly compressed, not gaping; beaks entire, interior subnacreous. Hinge composed of a posterior more or less prominent callus in the right valve, fitting into a corresponding depression in the left valve, and an anterior elongated marginal lamellar tooth or ridge; cartilage internal, situated perpendicularly under the umbones, and covered by a large triangular ossicle. Muscular impressions moderate; pallial line sinuated.

This genus has much the appearance externally of *Periploma*, but the ossicle is large and triangular as in *Lyonsia*. It differs from both genera in the cartilage not being supported by projecting spoon-shaped processes, and in its being perpendicular to the umbones.

ALICIA ANGUSTATA, n. s. (Pl. XLIV. fig. 1.)

Shell elongately oblong, white, surface of valves (under the lens) very finely decussated, inequilateral; anterior side five-sixths the length of the shell, rounded at the extremity, the dorsal margin slightly convex; posterior side truncate at the extremity, the dorsal margin incurved, umbonal slope angulated; ventral margin almost straight. The hinge with the posterior callus in the right valve prominent and tooth-like, and the corresponding depression in the left valve bordered by a slightly raised ridge. Pallial sinus deep, extending to half the length of the shell.

Long.  $6\frac{1}{2}$ , alt. 3, lat.  $1\frac{1}{2}$  lines.

Hab. Port Jackson. Dredged inside South Head Reef.

ALICIA ELEGANTULA, n. s. (Pl. XLIV. fig. 2.)

Shell oblong, white, obsoletely concentrically plicate, very minutely decussated, inequilateral; anterior side three-fifths the length of the shell, rounded; posterior side roundly truncate, the dorsal margin concave, umbonal slope angulated; ventral margin convex. The hinge with the posterior callus almost obsolete. Pallial sinus deep, extending to the umbones.

Long.  $5\frac{1}{2}$ , alt. 3, lat.  $1\frac{1}{2}$  lines.

Hab. Port Jackson. Dredged between Watson's Bay and "Sow and Pigs" reef.

THRACIA MODESTA, n. s. (Pl. XLIV. fig. 3.)

Shell ovate, thin, white, rather ventricose, surface of valves irregularly concentrically striate, inequilateral, beaks posterior; anterior side rotundate; posterior side obliquely truncate, the dorsal margin



nearly straight, the umbonal slope angulated; ventral margin convex. The hinge with the cartilage processes small. Pallial sinus extending beyond the umbones.

Long. 7, alt.  $4\frac{1}{2}$ , lat.  $2\frac{1}{2}$  lines.

*Hab.* Dredged off Ball's Head, Port Jackson, in 15 fathoms.

*DOSINIA PUELLA*, n. s. (Pl. XLIV. fig. 4.)

Shell small, orbicular, rather thick, moderately convex, whitish, finely and closely irregularly concentrically striated; umbones somewhat produced and approximate; ligamental area but slightly excavated; lunule small, superficial, not impressed.

Long. 6, alt. 6, lat. 3 lines.

*Hab.* Botany Bay, New South Wales.

*SUNETTA ADELINÆ*, n. s. (Pl. XLIV. fig. 5.)

Shell smooth, elongately ovate, anterior side rounded, posterior slightly truncate; ventral margin somewhat bulged in the middle, a little tumid towards the umbones, whitish, painted with angular chocolate markings along the posterior slope, with a few of the same description, but fainter, proceeding downwards from the umbones, and covered towards the margins with a very slight pale olive epidermis; ligamental area narrowly excavated; lunule strongly defined and narrow, with the lips projecting beyond the line of the dorsal slope; interior white, tinged with flesh-colour, edges of the valves finely crenated within.

Long. 8, alt. 6, lat. 3 lines.

*Hab.* Dredged in deep water near Port-Jackson Heads.

This species differs from *Meroë hians*, Reeve (from Cochin China), in being smaller, much less tumid, more rounded at the ventral margin, and somewhat truncate posteriorly; the lunule also is prominent and projecting, whereas in *M. hians* it is flat; and the dark purple spot so characteristic of the interior of the latter is wanting in the species described above.

*SPISULA CRETACEA*, n. s. (Pl. XLIV. fig. 6.)

Shell triangularly ovate, solid, rough, chalky-white, rudely concentrically striated; umbones nearly central, acute, approximate; basal margin arcuate; anterior side rounded; posterior side slightly angled, and obtusely keeled from the umbones; the dorsal area broad, with the margin slightly arcuate; lateral teeth elongate and strongly cross-ribbed on both sides.

Long. 9, alt.  $6\frac{1}{2}$ , lat. 5 lines.

*Hab.* Dredged at Port Stephen, off Tarlee.

*SPISULA PRODUCTA*, n. s. (Pl. XLIV. fig. 7.)

Shell small, rather solid, ovately cuneiform, white, finely irregularly concentrically striated, and covered with a thin membranaceous epidermis towards the sides and basal margin; umbones tumid, acute, approximate; anterior side rounded, shorter; posterior side pro-

duced, somewhat beaked, obtusely keeled from the umbones; lateral teeth finely serrated.

Long. 7, alt. 5, lat. 3 lines.

*Hab.* Johnson's Bay and Parramatta River, Port Jackson.

This species resembles in external appearance the *Maetra lateralis* of Say, from South Carolina; it is, however, flatter and less sharply keeled, with the posterior dorsal slope longer and straighter, and the umbones closer together, whilst the serrated character of the lateral teeth would alone distinguish it from the American shell.

*LORIPES ASSIMILIS*, n. s. (Pl. XLIV. fig. 8.)

Shell somewhat triangularly orbicular, rather inflated, slightly superficially excavated at the anterior side, solid, whitish, concentrically very finely elevately striated throughout; margins crenate; cartilage in an oblique groove of the hinder hinge-margin.

Long. 6, alt. 6, lat.  $3\frac{1}{4}$  lines.

*Hab.* New South Wales; and Hobson's Bay, Port Philip.

This species differs from *L. icterica*, Reeve, in being more solid and inflated, more strongly concentrically ridged, and in the absence of the diverging radiate striæ of the latter.

*MYSIA (FELANIA) ADAMSI*, n. s. (Pl. XLIV. fig. 9.)

Shell depressly orbicularly elongate, white, shining, covered with a very thin transparent horny epidermis; concentrically very finely irregularly striated, smooth and polished at the umbones; lunule very small; margins simple. Hinge with two teeth in each valve, one of which is bifid.

Long. 6, alt.  $6\frac{1}{2}$ , lat.  $3\frac{1}{2}$  lines.

*Hab.* Port Jackson. Dredged in deep water.

*MYSIA (FELANIA) JACKSONIENSIS*, n. s. (Pl. XLIV. fig. 10.)

Shell triangularly depressly orbicular, posterior side rounded, anteriorly somewhat obliquely produced, pale rosy flesh-colour, covered with a light-green shining epidermis; umbones produced, approximate; concentrically finely irregularly striate, the lines of growth strongly impressed at intervals; interior pinkish.

Long. 4, alt.  $4\frac{1}{4}$ , lat.  $2\frac{1}{2}$  lines.

*Hab.* Dredged in deep water in Port Jackson.

*LEPTON ADAMSI*, n. s. (Pl. XLIV. fig. 11.)

Shell triangularly ovate, rather convex, inequilateral, milky white, somewhat transparent, thin, shining; surface of valves finely concentrically striated, and minutely shagreened anteriorly and posteriorly, smooth in the middle; anterior side short, rounded; posterior side ovate, widely plicate towards the margin; umbones prominent and slightly oblique; superior margin convex; the inferior margin straight.

Long.  $6\frac{1}{2}$ , alt. 5, lat.  $2\frac{3}{4}$  lines.

*Hab.* Port Jackson.

## MODIOLARIA BARBATA, n. s. (Pl. XLIV. fig. 12.)

Shell small, oblong-ovate, more or less convex, whitish, covered with a yellowish-green horny epidermis, which becomes long, thick, and fibrous posteriorly; the valves very finely concentrically irregularly striated, and decussated with elevated radiating ribs, which are obsolete near the middle.

Long. 5, alt. 2, lat.  $1\frac{1}{2}$  lines.

*Hab.* Botany Bay, New South Wales.

## OSTREA VIRESCENS, n. s. (Pl. XLIV. fig. 13.)

Shell solid, orbicular, inequivalve, with the margins of the valves crenulately frilled. Superior valve smaller, flattened, radiately plicate, and laminately scaled, whitish, irregularly striped with purplish brown; inferior valve larger, the cavity deep; interior greenish olive, paler at the margins; cardinal area large, triangular, and flattened.

Long.  $1\frac{3}{4}$ , lat.  $1\frac{1}{2}$  inch.

*Hab.* Attached to rocks and madrepores at low spring tides at Watson's Bay, Port Jackson.

## CROSSEA CONCINNA, n. s. (Pl. XLIV. fig. 14.)

Shell narrowly umbilicate, turbinate, rather solid, white, semipelucid; spire raised, suture distinct; whorls five, rounded, the first three transversely ribbed and longitudinally striated, the remainder transversely punctate-striate; umbilicus bordered by a rounded callosity; aperture circular, with a channelled angular projection in front; outer lip simple, the margin acute.

Diam. 2 lines, height  $1\frac{1}{2}$ .

*Hab.* "Sow and Pigs" reef, Port Jackson, from 2 to 4 fathoms.

This species has much the form of *C. bellula*, A. Ad., but differs in size, being considerably larger, and in the sculpture of the whorls; the angular projection of the aperture also is not so strongly developed. The only two species of the genus hitherto known were obtained by Mr. Arthur Adams from the Gotto Islands in Japan.

## DESCRIPTION OF PLATE XLIV.

Fig. 1. *Alicia angustata*, p. 908.

2. — *elegantula*, p. 908.

3. *Thracia modesta*, p. 908.

4. *Dosinia puella*, p. 909.

5. *Sunetta adelina*, p. 909.

6. *Spisula cinctacea*, p. 909.

7. — *producta*, p. 909.

Fig. 8. *Loripes assimilis*, p. 910.

9. *Felania adamsi*, p. 910.

10. — *jacksoniensis*, p. 910.

11. *Lepton adamsi*, p. 910.

12. *Modiolaria barbata*, p. 911.

13. *Ostrea virescens*, p. 911.

14. *Crossea concinna*, p. 911.

6. A List of Species of Marine Mollusca found in Port Jackson Harbour, New South Wales, and on the adjacent Coasts, with Notes on their Habits &c. By GEORGE FRENCH ANGAS, F.L.S., C.M.Z.S. &c.—Part II.\*

[The length, as given in inches or lines, must be understood to represent the extreme measurement of the shell.

Those species marked with an asterisk (\*) have been described from specimens in my own collection.—G. F. A.]

### Class CONCHIFERA.

### Order PHOLADACEA.

### Fam. GASTROCHÆNIDÆ.

#### 1. BRYOPA (DACOSTA) AUSTRALIS.

*Clavagella australis*, Sow.

Found burrowing in sandstone rocks, at very low tide, near Port-Jackson Heads. The tube, which is simple, projects outwards from 1 to 2 inches. The valves are hidden in the dilated hinder part of the tube, below the surface of the rock.

#### 2. HUMPHREYIA STRANGEI.

*Aspergillum strangei*, A. Ad. P. Z. S. 1852, p. 91, pl. 15. f. 5.

Of this singular form three or four specimens were obtained by the late Mr. F. Strange, and one by myself, at Watson's Bay, Port Jackson. The tube, which is merely an expansion and modification of the valves, is curved and obtusely carinated on each side. It is found attached to the flat surface of rocks at the bottom of pools, projecting upwards amongst the pebbles and sand, at extremely low spring tides. Length of the tube 2 inches 4 lines.

### Fam. SOLENIDÆ.

#### 3. SOLEN SLOANII.

*Solen sloanii*, Gray, in Brit. Mus., Hanley, Sp. of Shells, p. 12.

? *Solen philippianus*, Dunker.

A pretty species, mottled with purplish flesh-colour like *S. vaginoides*, Lam., from Tasmania; it is, however, a narrower shell, and not curved like the latter. Length  $3\frac{1}{4}$  inches. Burrowing in the sand at Middle Harbour &c.

#### 4. CULTELLUS AUSTRALIS.

*Cultellus australis*, Dunker, P. Z. S. 1861, p. 423.

Dredged in Lane-Cove River, Port Jackson. Length  $1\frac{1}{4}$  inch. Found also at Moreton Bay and Port Curtis, where it attains the length of 3 inches.

\* Continued from p. 233.

## Fam. SAXICAVIDÆ.

## 5. SAXICAVA AUSTRALIS.

*Saxicava australis*, Lam. Anim. sans Vert. vi. p. 153.

Found amongst crevices of rocks at low water in Port Jackson. It is extremely variable in form, like the other species of the genus. Length 10 lines.

## Fam. CORBULIDÆ.

## 6. CORBULA TUNICATA.

*Corbula tunicata*, Hinds, P. Z. S. 1843.

This fine species has the left valve, which is much the largest, deeply grooved over its entire surface. The right valve is grooved near the umbo only. Dredged in 5 to 7 fathoms in Port Jackson. Also from the Philippines (Cuming), and the Straits of Macassar and L'Agulhas Bank (Hinds). Length 1 inch.

## 7. CORBULA NASUTA.

*Corbula nasuta*, Sow. P. Z. S. 1833.

It is impossible to separate this species from *C. nasuta*, Sow., which comes from the Gulf of Nicoya. Dredged in Port Jackson. Length 10 lines.

## 8. CORBULA SCAPHOIDES.

*Corbula scaphoides*, Hinds, P. Z. S. 1833.

Dredged in Port Jackson. Length 6 lines.

## 9. CORBULA ZELANDICA.

*Corbula zeylandica*, Quoy et Gaim. Voy. de l'Astrol.

? *C. catlowæ*, Reeve, P. Z. S. 1844.

Dredged in Middle Harbour. Length 6 lines. It occurs also in New Zealand and at Moreton Bay.

## Fam. ANATINIDÆ.

## 10. ANATINA CRECCINA.

*Anatina creccina*, Valenciennes, MS. in Mus. Cuming; Reeve, Conch. Icon. *Anatina*, pl. 2. f. 12.

In this species the posterior portion of the valves is widely gaping and curved upwards. It is found in sandy mud at Illawarra Lake, Port Stephen, and Port Jackson. Length 1 inch 10 lines.

## 11. ANATINA TASMANICA.

*Anatina tasmanica*, Reeve, Conch. Icon. *Anatina*, pl. 3. f. 20.

More ovate than the preceding, with the umbones nearly central. From sandy mud in Port Jackson. Length 2 inches.



## 12. ANATINA PROLONGATA.

*Anatina prolongata*, Reeve, Conch. Icon. *Anatina*, pl. 4. f. 28.

A thin narrow species, with the valves produced posteriorly and ridged throughout. Dredged in sandy mud near Spectacle Island, Parramatta River. Length 9 lines.

## 13. \*ALICIA ANGUSTATA.\*

*Alicia angustata*, Angas, *anteà*, p. 908, Pl. XLIV. f. 1.

In this genus the ossicle is large and triangular as in *Lyonsia*; but the cartilage is not supported by projecting spoon-shaped processes, and is perpendicular to the umbones. The shells externally somewhat resemble *periploma*, and are thin, white, and abruptly truncate at the posterior side. Dredged inside South Head reef. Length  $6\frac{1}{2}$  lines.

## 14. \*ALICIA ELEGANTULA.

*Alicia elegantula*, Angas, *anteà*, p. 908, Pl. XLIV. f. 2.

More rounded than the preceding species, with the umbones more central. Dredged between Watson's Bay and the "Sow and Pigs" reef. Length  $5\frac{1}{2}$  lines.

## 15. THRACIA ANATINOÏDES.

*Thracia anatinoïdes*, Reeve, Conch. Icon. *Thracia*, pl. 3. f. 12.

Roundly ovate, thin, and convex, shortly angled posteriorly, and broadly rounded in front. Dredged in Port Jackson. Length 1 inch.

## 16. THRACIA AUSTRALICA.

*Thracia australica*, Reeve, Conch. Icon. *Thracia*, pl. 3. f. 13.

A somewhat depressed species, with the aspect of a *periploma*. Dredged in Port Jackson. Length 9 lines.

## 17. \*THRACIA MODESTA.

*Thracia modesta*, Angas, *anteà*, p. 908, Pl. XLIV. f. 3.

A small ovate species, with the posterior side very obliquely truncate. Dredged off Ball's Head, Port Jackson, in 15 fathoms. Length 7 lines.

## 18. NEÆRA (RHINOMYA) RUGATA.

*Rhinomya rugata*, A. Ad. Ann. & Mag. Nat. Hist. 3rd ser. vol. xiii. p. 207.

An elegant little shell, largely rostrate, and concentrically ridged throughout. Dredged at the "Sow and Pigs" reef. Length  $3\frac{1}{2}$  lines. The type specimen of this species was dredged by Mr. A. Adams at Tabu Sima, in Japan.

## 19. THEORA NITIDA.

*Theora nitida*, Gould, 'Otia,' p. 162.

A thin, hyaline shell, with the valves attenuate posteriorly; the

hinge with a small spoon-shaped process projecting inwards. Dredged in Port Jackson, in deep water. Length 6 lines.

20. MYODORA CRASSA.

*Anatina crassa*, Stutchbury, Zool. Journ. v. p. 100, Tab. Suppl. 43. f. 5, 6.

A thick, triangular species, with both valves transversely ribbed. Dredged in Middle Harbour. Length 6 lines.

21. MYODORA PANDORÆFORMIS.

*Anatina pandoræformis*, Stutchbury, Zool. Journ. v. p. 99, Tab. Suppl. 43. f. 3, 4.

The striæ on the right or flattened valve are very fine and smooth. Dredged in Middle Harbour on a sandy bottom. Length 10 lines.

22. MYODORA OVATA.

*Myodora ovata*, Reeve, Conch. Icon. *Myodora*, pl. 1. f. 4.

Shorter than the preceding species, with the striæ on both valves raised and prominent. Dredged in Port Jackson. Length 7 lines.

This species occurs in Port-Adelaide Creek, South Australia; and also in the Philippines, according to Cuming.

23. MYODORA BREVIS.

*Anatina brevis*, Stutchbury, Zool. Journ. v. p. 99, Tab. Suppl. 43. f. 1, 2.

A very elegant, thin, triangular-shaped shell, with the left valve flexuously striated anteriorly. Dredged in Lane Cove, Farm Cove, and Mossman's Bay. Length 1 inch.

24. MYOCHAMA ANOMIOIDES.

*Myochama anomioides*, Stutchbury, Zool. Journ. v. pl. 42. f. 1-4.

This remarkable shell is usually found attached to the living shells of *Trigonia lamareki*. It varies in form, is of a pinkish colour, and in its sculpture partakes somewhat of that of the shell on which it is parasitic. Dredged near the "Sow and Pigs" reef, in Port Jackson. Length 9 lines.

25. MYOCHAMA STRANGEI.

*Myochama strangei*, A. Ad. P. Z. S. 1852, pl. 15. f. 2.

An oblong, wrinkled species, of a blackish colour, found attached to stones or dead shells. Dredged in Port Jackson (inside the North Head), but of very rare occurrence. Length 1 inch.

26. CHAMOSTREA ALBIDA.

*Chama albida*, Lam.

*Cleidotherus chamoides*, Stutchbury, Zool. Journ. p. 98, Tab. Suppl. 42. f. 5-8; Sow. Gen. of Shells, f. 1-3.

This curious genus, of which one species only is known, is pecu-

liar to Australia. The valves are connected internally by an ossicle in the cartilage, are rough outside, and somewhat pearly within. The left valve is nearly flat and triangular; whilst the right one is convex, and attached by its front slope to the upper surface of flat sandstone rocks which are laid bare at low water. It occurs near Port-Jackson Heads. I have also procured fine large specimens from Port Lincoln, in South Australia. Length  $2\frac{1}{2}$  inches.

## Order VENERACEA.

### Fam. MACTRIDÆ.

#### 27. TRIGONELLA CONTRARIA.

*Macra contraria*, Desh. P. Z. S. 1854; Reeve, Conch. Icon. *Macra*, pl. 17. f. 86.

Somewhat like *M. rufescens*, Lam., but flatter and more beaked at the sides, with the umbones smooth, and stained with two violet rays. Rare in Port Jackson. Length  $1\frac{3}{4}$  inch.

#### 28. TRIGONELLA LUZONICA.

*Macra luzonica*, Desh. P. Z. S. 1854; Reeve, Conch. Icon. *Macra*, pl. 16. f. 81.

A neat species, more or less rayed with brown, and tinged with purple at the umbones. Dredged in Middle Harbour on a sandy bottom, also in Botany Bay. Length 1 inch 3 lines.

#### 29. TRIGONELLA PUSILLA.

*Macra pusilla*, A. Adams, P. Z. S. 1855, p. 226.

A pretty, little, shining species, either white or rayed with brown. Dredged in Middle Harbour along with the foregoing. Length 7 lines.

#### 30. \*SPISULA CRETACEA.

*Spisula cretacea*, Angas, *anteà*, p. 909, Pl. XLIV. f. 6.

A dull-white, chalky-looking shell, not unlike in form to the British *S. subtruncata*. Dredged in Port Stephen. Length 10 lines.

#### 31. SPISULA CORBULOIDES.

*Macra corbuloides*, Desh. P. Z. S. 1854; Reeve, pl. 19. f. 103.

? *Macra rostrata*, Spengler, Skrift. Nat. Selsk. v. p. 115.

A stout, gibbous, trigonal species, strongly keeled from the umbones, and covered with a pale greenish-olive epidermis. Dredged in Illawarra Lake. Length 11 lines. A dwarf variety is found in Rusheutter's Bay, Port Jackson, and also at Moreton Bay; it measures 5 lines in length.

#### 32. \*SPISULA PRODUCTA.

*Spisula producta*, Angas, *anteà*, p. 909, Pl. XLIV. f. 7.

A small, whitish, triangular, somewhat compressed species, pro-

duced posteriorly. Found in the mud at Johnson's Bay, and on the banks of the Parramatta River. Length 7 lines.

Subfam. LUTRARIINÆ.

33. LUTRARIA DISSIMILIS.

*Lutraria dissimilis*, Desh. P. Z. S. 1854; Reeve, Conch. Icon. *Lutraria*, pl. 2. f. 8.

Like *L. rhynchæna*, Jonas, but less curved and gaping. In sandy mud, Middle Harbour. Washed up on the beach at Edward's Bay occasionally after storms. Length 3 inches 9 lines.

34. ?STANDELLA OVALINA.

*Macra ovalina*, Lam. Anim. sans Vert. vi. p. 104.

A smooth, ovate, whitish shell, rather gaping posteriorly, with the hinder slope narrowly keeled. Dredged in Middle Harbour. Length 1 inch 5 lines. This species occurs also at Port Phillip.

35. ZENATIA ACINACES.

*Lutraria acinaces*, Quoy & Gaim. Voy. de l'Astrol. iii. p. 545, t. 83. f. 5, 6; Reeve, Conch. Icon. *Lutraria*, pl. 4. f. 14.

A large, oblong, compressed shell, resembling a flattened *Lutraria*, with the umbones anterior; covered at the sides with an olive-brown epidermis. Botany Bay, very rare. Length 4 to 5 inches. Also from New Zealand, according to Quoy, Earl, and Dieffenbach.

Fam. TELLINIDÆ.

36. GARI (PSAMMOCOLA) TOGATA.

*Psammobia togata*, Desh. P. Z. S. 1854, p. 318.

A large ovately transverse shell, obliquely truncate posteriorly, white, and clothed with a strong olive-green epidermis, more or less eroded at the umbones. Length  $3\frac{1}{2}$  inches. Port Jackson, Port Essington, and the Philippines.

Externally this shell has somewhat the aspect of a *Glauconomya*, and may be regarded as the type of a distinct group of the family *Tellinidæ*.

37. GARI MALACCANA.

*Psammobia malaccana*, Reeve, Conch. Icon. pl. 6. f. 42.

A shining white species, delicately sculptured with oblique grooved striæ, which suddenly terminate on the posterior side. Length 1 inch 3 lines. Dredged at Lane Cove, Port Jackson; also Port Denison, and Malacca (Cuming).

38. GARI ZONALIS.

*Psammobia zonalis*, Lam. Anim. sans Vert. vi. p. 182.

A compressed species, of a pale livid-brown colour, rayed with white. Length 1 inch. Middle Harbour; also Tasmania.

## 39. GARI (AMPHICHÆNA) MENKEANA.

*Psammobia menkeana*, Reeve, Conch. Icon. pl. 6. f. 43.

A pretty little species, somewhat resembling the British *P. tellinella*, Lam., of a yellowish or purplish white, faintly rayed with pale rose-colour. Length 11 lines. Dredged near the "Sow and Pigs" reef and in Middle Harbour.

## 40. HIATULA EPIDERMIA.

*Soletellina epidermia*, Desh.; Reeve, Conch. Icon. pl. 1. f. 3.

A somewhat rounded species, livid purple or orange near the umbones, and covered with an olive epidermis. Length  $2\frac{1}{2}$  inches. This species ranges commonly from Port Jackson to Swan River.

## 41. HIATULA BIRADIATA.

*Solen biradiatus*, Wood, Gen. Conch. pl. 33. f. 1.

Flatter and more elongated than the preceding species, zoned with livid purple, with two white rays posteriorly and an olive-green epidermis. Length 1 inch 9 lines. Middle Harbour. This is a common species in the South-Australian gulfs.

## 42. HIATULA FLORIDA.

*Psammobia florida*, Gould, Expedition, Shells, Proc. Boston Nat. Hist. Soc. 1846.

*Soletellina donacioïdes*, Reeve, Conch. Icon. pl. 3. f. 11, 1857.

A transversely oblong thin species, livid purple, paler anteriorly, with two faint posterior rays, and covered with a dark transparent horny epidermis. Length 15 lines. Dredged in Illawarra Lake in brackish water.

## 43. TELLINA (TELLINELLA) DELTOIDALIS.

*Tellina deltoidalis*, Lam. Anim. sans Vert. vi. p. 206.

*T. luctea*, Quoy.

A flattened, rounded, white shell, beaked posteriorly. Dredged in Illawarra Lake and Botany Bay. Length  $1\frac{1}{2}$  inch. This species varies greatly in size and aspect, and has a wide range over the southern portion of Australia, Tasmania, and New Zealand. All the specimens obtained in the Illawarra Lake are tinged with flesh-colour.

## 44. \*TELLINA (ARCOPAGIA) ELLIPTICA.

*Tellina elliptica*, Sow. in Conch. Icon. *Tellina*, pl. 39. f. 223.

A small, white, ovate, and somewhat flattened species, with the posterior side the shorter. Dredged in Port Jackson. Length 5 lines.

## 45. \*TELLINA (? MACOMA) SUBELLIPTICA.

*Tellina subelliptica*, Sow. in Conch. Icon. *Tellina*, pl. 39. f. 220 a, b.



Rounder and more inflated than the preceding, with the umbones central; finely concentrically ridged; white or livid purple. Dredged at Watson's Bay in 3 fathoms. Length 5 lines.

46. \*TELLINA (MÆRA) SEMITORTA.

*Tellina semitorta*, Sow. in Conch. Icon. *Tellina*, pl. 39. f. 221 *a, b*.

A small, elongately ovate, bean-shaped species, very short posteriorly, and finely concentrically grooved throughout, pale yellowish or pinkish white. Dredged in Port Jackson. Length 6 lines.

47. TELLINA (ANGULUS) TICAONICA.

*Tellina ticaonica*, Desh. P. Z. S. 1854, p. 358.

A nearly smooth, pale rose-coloured, shining species. Dredged at Lane Cove. Length 5 lines. Found also in the Philippines.

48. \*TELLINA TENUILIRATA.

*Tellina tenuilirata*, Sow. in Conch. Icon. *Tellina*, pl. 39. f. 219 *a, b*.

A small elegantly shaped shell, somewhat beaked and truncate behind, and finely lirate throughout, white and shining, sometimes carnation-red. Dredged at the "Sow and Pigs" bank. Length 6 lines.

49. \*TELLINA (ANGULUS) UNIFASCIATA.

*Tellina unifasciata*, Sow. in Conch. Icon. *Tellina*, pl. 29. f. 156.

A thin flattened species, smooth and shining anteriorly, and delicately one-rayed, with pink at the posterior slope. In aspect very like *T. exilis*, Lam., from Japan, which is pink, with two white rays posteriorly. Dredged in Port Jackson. Length  $5\frac{1}{2}$  lines.

50. TELLINA (ANGULUS) LILIUM.

*Tellina lilium*, Hanley, P. Z. S. 1844; Thes. Conch. *Tellina*, pl. 58. f. 85.

A pure-white species, nearly smooth, with the posterior area grooved. Dredged at Lane Cove. Length 8 lines.

51. \*TELLINA SEMIPLANA.

*Tellina semiplana*, Sow. in Conch. Icon. *Tellina*, pl. 39. f. 222 *a, b*.

A smooth, flattened, white species, with but little character. Dredged in Port Jackson. Length 1 inch.

52. \*TELLINA SEMIFOSSILIS.

*Tellina semifossilis*, Sow. in Conch. Icon. *Tellina*, pl. 41. f. 237.

A rough-looking, somewhat ovately formed species, more or less eroded at the umbones, yellowish white, here and there rudely concentrically ridged. Johnson's Bay, Port Jackson, on mud at low water. Length 9 lines.

## Subfam. DONACINÆ.

## 53. DONAX (LATONA) DELTOIDES.

*Donax deltoides*, Lam. Anim. sans Vert. vi. p. 241.

*D. epidermia*, Lam.; Reeve, Conch. Icon. *Donax*, pl. 1. f. 4 *a*, *b*.

This fine species is abundant on most of the sandy beaches of Australia which are exposed to the surf. It ranges from Swan River to Moreton Bay. In colour it varies from greenish olive to purple, and sometimes orange-yellow. Outer Manly Beach, in sand at low water. Length  $2\frac{1}{2}$  inches.

## Subfam. PAPHIINÆ.

## 54. DONACILLA ELONGATA.

*Mesodesma elongata*, Desh.; Reeve, Conch. Icon. *Mesodesma*, pl. 1. f. 5.

Triangularly elongated, and at the posterior side short and truncated; covered with a shining yellowish-olive epidermis. Buried in sand at low tide. Botany Bay. Length 1 inch 1 line. This species has a wide range to South Australia, Tasmania, and Swan River.

## 55. \*DONACILLA OBTUSA.

*Mesodesma obtusa*, Crosse & Fischer, Journal de Conch. 1864, p. 350.

An ovate species, of a waxy white, roundly truncate behind, and compressed and wedge-shaped in front, with a light-brown epidermis towards the margins. From the Sand-spit, Middle Harbour. Length 9 lines. This species is common at Port Lincoln, in South Australia.

## Fam. VENERIDÆ.

## Subfam. VENERINÆ.

## 56. VENUS LAQUEATA.

*Venus laqueata*, Sow. Thes. Conch. xi. pl. 153. f. 15; Reeve, Conch. Icon. *Venus*, pl. 6. f. 20.

This noble species is characterized by the concentric ridges forming erect crenated frills, the interstices between which are regularly longitudinally ribbed. Colour pale fulvous, sometimes rayed with four indistinct brown bands. Dredged in sandy mud in Port Jackson. Length 3 inches. Found also at Moreton Bay.

## 57. CHIONE STRIATISSIMA.

*Venus striatissima*, Sow. Thes. Conch. p. 44, pl. 157. f. 103-105; Reeve, Conch. Icon. *Venus*, pl. 26. f. 135.

A pretty little pointed ovate species, cancellated with concentric waved ridges and longitudinal striæ; in general aspect somewhat like the British *V. ovata*, Penn. Dredged at Watson's Bay &c. Length 8 lines.

## 58. CHIONE (CIRCOMPHALUS) ROBORATA.

*Venus roborata*, Hanley, P. Z. S. 1844, p. 161; Reeve, Conch. Icon. *Venus*, pl. 23. f. 113.

A solid, rounded species, less inflated than *V. calophylla*, of a waxy-white colour, with the concentric ridges very numerous, thickened, and curved inwards. A single example only of this shell was dredged at the "Sow and Pigs" bank, Port Jackson; in Tasmania it is of frequent occurrence. Length 1 inch 2 lines\*.

## 59. CHIONE (CIRCOMPHALUS) CALOPHYLLA.

*Venus calophylla*, Hanley, Recent Shells, App. p. 361, pl. 16. f. 26; Reeve, Conch. Icon. *Venus*, pl. 23. f. 114.

A very elegant species, with distant, thin, erect frills, the surface of the valves between which is smooth; white or pale flesh-colour. Dredged in black mud at the mouth of Lane Cove, and at Port Stephen. Length  $1\frac{1}{2}$  inch. This shell may at once be distinguished from the still more beautiful *V. lamellata*, Lam. (from South Australia), by its rounded form, smaller size, and the erect frills being nearly smooth, and not grooved on their undersides.

## 60. CHIONE (CIRCOMPHALUS) ALATUS.

*Venus alatus*, Reeve, Conch. Icon. *Venus*, pl. 18. f. 83.

A solid, nearly smooth species, broadly rayed with pale brown, with a few erect ridges at the posterior side. The young shells are more or less distantly ridged throughout. From deep water on the coast, at Wollongong, Port Stephen, &c. Length 2 inches 3 lines. I obtained several specimens of this species on the beach at Porirua, Cook's Straits, New Zealand.

## 61. CHIONE (TIMOCLEA) AUSTRALIS.

*Venus australis*, Sow. Thes. Conch. p. 48, pl. 157. f. 111, 112; Reeve, Conch. Icon. *Venus*, pl. 22. f. 107.

A pretty, ovate species finely ridged and cancellated, and blotch-rayed with chestnut. Interior rose-purple. Dredged at Watson's Bay. Length 1 inch 3 lines. It occurs also in South Australia and at Swan River.

## 62. CHIONE (MARCIA) FUMIGATA.

*Venus fumigata*, Sow. Thes. Conch. p. 102, pl. 159. f. 152-155; Reeve, Conch. Icon. *Tapes*, pl. 7. f. 31.

A somewhat inflated, ovate species, acuminate produced posteriorly, smooth, and of a light olive-grey colour throughout, with the posterior slope of the dorsal margin grooved. Dredged in Illawarra Lake. Length  $1\frac{1}{2}$  inch.

\* The *Venus isabellina*, Phil. (Reeve, Conch. Icon. pl. 23. f. 112), stated to come from "Sydney," I have never met with there. My specimens are from Port Curtis. It seems to be intermediate between *V. calophylla*, Hanl., and *V. dysera*, Chemn., the latter a well-known Chinese species, which Mr. Reeve curiously ignores.

## 63. CHIONE (MARCIA) LÆVIGATA.

*Venus lævigata*, Sow. Thes. Conch. p. 103, pl. 159. f. 156-158.

Flatter and less beaked than the preceding species, painted with two or three zigzag rays from the umbones, and wanting the characteristic grooving of the posterior dorsal slope. Dredged in mud in Port Jackson and Port Phillip (Hobson's Bay). Length  $1\frac{1}{2}$  inch.

## 64. CALLISTA DISRUPTA.

*Cytherea disrupta*, Sow. Thes. Conch. p. 117, pl. 163. f. 208, 209.

A transversely ovate shell, with the dorsal margin arched; smooth, or very finely concentrically striated, yellowish, and painted with purplish-brown zigzag bands and flames. Dredged at Watson's Bay &c. Length  $1\frac{1}{2}$  inch. Found also at Moreton Bay, on the banks off Stradbroke Island.

## 65. CALLISTA RUTILA.

*Cytherea rutila*, Sow. Thes. Conch. p. 116, pl. 163. f. 205.

More rounded and larger than the preceding species, smooth, and painted with irregular interrupted bands of chestnut, and tinged with rose-colour round the posterior side and ventral margin. Dredged at Watson's Bay, and found on the beach at Cabbage-tree Cove, outside the north head of Port Jackson. Length 1 inch 9 lines. I have received specimens from the east coast of Tasmania 2 inches 3 lines across.

## 66. TIVELA UNDULOSA, var.

*Venus undulosa*, Lam. Anim. sans Vert. vi. p. 370.

*V. variabilis*, Sow. P. Z. S. 1835; Thes. Conch. *Venus*, pl. 158. f. 142-146.

This species varies considerably in shape and markings. At Swan River, where it is very abundant, the shells are richly rayed and marked with angular and undulating brown lines; occasionally they are white. The Port Jackson specimens, which are of rare occurrence, are smaller, more trigonal, painted sparingly with narrow fulminating lines, and clothed with a thick, silky, fibrous epidermis. Dredged at Watson's Bay. Length 1 inch.

## 67. \*SUNETTA ADELINÆ.

*Sunetta adelinæ*, Angas, *antè*, p. 909, Pl. XLIV. f. 5.

A pretty little species, less tumid than *Meroë hians* of Reeve (from Cochin China), with the lunule pinched outwards and projecting. Length 8 lines. Dredged in deep water near Port-Jackson Heads.

## 68. CIRCE UNDATINA.

*Cytherea undatina*, Lam.; Sow. Thes. Conch. *Circe*, pl. 138. f. 22-26.

A fine species, more ventricose than *C. scripta*, Linn., and elegantly painted with broad rays, blotches, bands, and zigzag lines of

brown on a whitish ground. Dredged off Spectacle Island, Parramatta River, Port Jackson, in sandy mud. Length 2 inches.

Subfam. DOSINIINÆ.

69. DOSINIA SCULPTA.

*Artemis sculpta*, Hanley; Reeve, Conch. Icon. *Artemis*, f. 52.

This species may readily be distinguished by its concentric striæ being decussated at the sides by fine radiating lines. Dredged in Port Jackson. Length 1 inch. At Moreton Bay it attains a larger size. Some of the Port Jackson specimens are slightly tinged with rose-colour at the umbones.

70. DOSINIA SCABRIUSCULA.

*Artemis scabriuscula*, Phil. Abbild. und Besch. Conch. ii. p. 230; Reeve, Conch. Icon. *Artemis*, pl. 3. f. 14.

I have only met with young examples of this fine species in Port Jackson. Japan, Ceylon, and North Australia are cited as its habitats. Full-grown shells measure nearly 2 inches across.

71. \*DOSINIA PUELLA.

*Dosinia puella*, Angas, *anteà*, p. 909, Pl. XLIV. f. 4.

A small, solid, orbicular species, with the lunule superficial, and the valves finely concentrically ridged. Length 6 lines. Botany Bay.

72. CLEMENTIA MORETONENSIS.

*Clementia moretonensis*, Deshayes, P. Z. S. 1853, p. 18.

A transversely oblong species of a dull white hue, with the surface of the valves rudely concentrically plicate. Length 1 inch 9 lines. Dredged at Mossman's Bay and off Spectacle Island. This species was first obtained by the late F. Strange at Moreton Bay; hence its name by Deshayes.

Subfam. TAPESINÆ.

73. TAPES INFLATA.

*Tapes inflata*, Desh. P. Z. S. 1853, p. 8, pl. 19. f. 3.

A fine ovately transverse species, irregularly concentrically sulcated, and smooth at the umbones; of a rufous fawn-colour, more or less radiately mottled with grey, and shining. Dredged in mud, at the mouth of Lane Cove and Parramatta River. Length  $2\frac{1}{2}$  inches. Allied to *T. sulcosa*, Phil., but much more ventricose and polished, with the sulcate ridges obsolete in the young shells.

74. TAPES UNDULATA, var.

*Venus undulata*, Born.

*Tapes rimosa*, Phil. Abbild. t. 7. f. 7.

This is a curious variety of the well-known *T. undulata* from the



China seas, in which the prevailing colour of the valves is greenish olive, passing into purple on the ventral margins, where alone the zigzag markings are visible. The dorsal area is strongly crossed with purple lines. Dredged in mud in the Parramatta River. Length 2 inches.

75. *TAPES TURGIDA*.

*Venus turgida*, Lam. Anim. sans Vert. vi. p. 353.

? *Tapes turgidula*, Desh. P. Z. S. 1853, p. 8.

A fine species, more or less finely concentrically ribbed, of a pale brown colour, ornamented with zigzag purplish lines, or three faint bands. Length  $3\frac{1}{2}$  inches. In mud at low water, Middle Harbour, Rose Bay, and Parramatta River.

76. *RUPELLARIA MITIS*.

*Venerupis mitis*, Desh. P. Z. S. 1853, p. 5.

A small species, not unlike *V. irus* of Europe. Length 8 lines. Botany Bay.

77. *RUPELLARIA CRENATA*.

*Venerupis crenata*, Lam. Anim. sans Vert. vi. p. 164.

A fine species, imbricately sculptured, and laminately frilled at the posterior side. It may be recognized by its peculiar chalky appearance blotched here and there with pale lilac. Found in crevices of rocks at low water in various bays in Port Jackson. It occurs also in Tasmania, and in South Australia, at the roots of mangrove trees. Length  $1\frac{1}{2}$  inch.

Fam. PETRICOLIDÆ.

78. *\*CHORISTODON RUBIGINOSUM*.

*Narario rubiginosa*, A. Ad. & Ang. P. Z. S. 1863, p. 425, pl. 37. f. 17.

This very interesting species is a thin ventricose shell, finely divaricately sculptured, rayed with brown and purple at the umbones, passing into white towards the ventral margin. I only obtained one living specimen and a single valve; the former was enclosed in a nodule of clay, dredged at 4 fathoms in Watson's Bay, Port Jackson. Length 10 lines.

Fam. GLAUCONOMYIDÆ.

79. *GLAUCONOMYA ANGULATA*.

*Glaucanome angulata*, Reeve, P. Z. S. 1844; Conch. Icon. *Glaucanome*, pl. 1. f. 5.

A much smaller species than *G. rugosa*, Hanley (which is found at Moreton Bay), in which the green epidermis is peculiarly shrivelled and wrinkled in the middle, whilst in *G. angulata* it lies in ridges parallel to the lines of growth. From sandy mud at low water,

Parramatta River and Lane Cove. Length 1 inch. Both these species occur also at the Philippine Islands.

Fam. CARDIIDÆ.

80. CARDIUM (PAPYRIDIUM) PAPYRACEUM.

*Cardium papyraceum*, Chem. Conch. Cab. vi. p. 190, pl. 18. f. 184; Reeve, Conch. Icon. *Cardium*, pl. 2. f. 9.

A thin whitish species, faintly mottled with flesh-colour, and tinged with deep purple at the umbones; the valves are radiately impressedly striated, and minutely granulated anteriorly, thus distinguishing it from *C. muticum*, which the elder Sowerby has figured as a variety in his 'Conch. Illustr.' f. 55. Dredged in Middle Harbour. Length  $1\frac{1}{2}$  inch.

81. CARDIUM (PAPYRIDIUM) TENUICOSTATUM.

*Cardium tenuicostatum*, Lam. Anim. sans Vert. vi. p. 372; Reeve, Conch. Icon. *Cardium*, pl. 10. f. 50.

A thin, light, somewhat ventricose shell, radiately very numerously finely ribbed, the epidermis bristling along the summit of the ribs; more or less waved with flesh-coloured painting, and purple at the umbones. Dredged in Port Jackson, Botany Bay, &c. Length  $1\frac{1}{2}$  inch.

82. CARDIUM PULCHELLUM.

*Cardium pulchellum*, Reeve, Conch. Icon. *Cardium*, pl. 8. f. 42. *C. striatulum* juv., Sow. Conch. Ill. f. 45.

This beautiful little species is finely striated and armed with sharp tubercles posteriorly; its colour is whitish, handsomely rayed with orange. *C. striatulum*, Sow., from Cook's Straits, New Zealand, is very similar in its sculpture, but it is a much larger shell, and wants the characteristic orange rays. Dredged inside Port-Jackson Heads in deep water. Length 7 lines.

83. CARDIUM AUSTRALIENSE.

*Cardium australiense*, Reeve, P. Z. S. 1844; Conch. Icon. pl. 5. f. 24.

A singular form of the genus, having much of the aspect of a *Donax* externally. Length 1 inch 6 lines. Deep water, Broken Bay, Port Stephen, and Moreton Bay.

Fam. CHAMIDÆ.

84. CHAMA SPINOSA.

*Chama spinosa*, Brod. Trans. Zool. Soc. i. p. 305, pl. 38. f. 8, 9.

A pretty little species, concentrically frilled with rows of short, irregular, imbricate spines; white, tinged with brick-red. Found attached to rocks at low spring tides. Length 1 inch.

## Order LUCINACEA.

## Fam. LUCINIDÆ.

## 85. LUCINA SIMPLEX.

*Lucina simplex*, Reeve, Conch. Icon. pl. 3. f. 11.

A neat white species, finely concentrically ribbed, and cancellated with very fine longitudinal striæ. Botany Bay. Length 9 lines. In North Australia this species attains the size of 15 to 18 lines.

## 86. LUCINA (CODAKIA) RUGIFERA.

*Lucina rugifera*, Reeve, Conch. Icon. pl. 1. f. 1.

A solid elaborately sculptured species, allied to *L. tigrina* and *L. exasperata*, white within and without. Found at low water amongst the rocks at Watson's Bay and Middle Harbour, Port Jackson; and at Wollongong and other rocky places along the coast. Length  $2\frac{1}{2}$  inches.

## 87. LUCINA (CODAKIA) PARVULA.

*Lucina parvula*, Gould, 'Otia,' p. 174.

This little species is somewhat produced anteriorly, concentrically ridged, and divaricately sculptured at the sides: yellowish white. Dredged in Port-Jackson and Botany Bays. Length 4 lines. The localities of Gould's types are China and Japan.

## 88. LORIPES TUMIDA.

*Lucina tumida*, Reeve, Conch. Icon. *Lucina*, pl. 5. f. 22.

An orbicular, swollen, thin shell of a dull white colour, superficially concentrically striated, and covered at the sides with a very fine epidermis radiately wrinkled here and there. Dredged in Port Jackson. Length 1 inch.

The *Lucina ovulum* of Reeve appears to be only the young state of this species.

## 89. LORIPES OVUM.

*Lucina ovum*, Reeve, Conch. Icon. *Lucina*, pl. 5. f. 21.

Less inflated than the preceding species, more truly orbicular in outline, and of a clear yellowish white. Dredged in Botany Bay. Length 11 lines.

## 90. LORIPES ICTERICA.

*Lucina ieterica*, Reeve, Conch. Icon. *Lucina*, pl. 10. f. 60 *a, b*.

A small white species, finely concentrically and (under the lens) radiately striated. The ligament, in this as well as in the following species, is situated in an oblique internal pit. Botany Bay; also in St. Vincent's Gulf, South Australia. Length 5 lines.

## 91. \*LORIPES ASSIMILIS.

*Loripes assimilis*, Angas, *antè*, p. 910, Pl. XLIV. f. 8.

More solid and inflated than the preceding, with the concentric ridges stronger, and the radiate sculpture wanting. New South Wales and Port Phillip. Length 6 lines.

FAM. UNGULINIDÆ.

92. *MYSIA SPHÆRICULA*.

*Diplodonta sphæricula*, Deshayes.

A thin, smooth, globular species, very much swollen towards the umbones, pearly white, covered with a fibrous olive epidermis towards the margins. Dredged in the Parramatta River and mouth of Lane Cove, in black mud in 3 or 4 fathoms. Length  $10\frac{1}{2}$  lines.

93. *MYSIA GLOBULOSA*.

*Diplodonta globulosa*, A. Adams, P. Z. S. 1855, p. 226.

A rounded species, of a dirty-white or horn-colour, not unlike *D. janeirensis*, Reeve. Dredged in Port Jackson. Length 7 lines.

94. \**MYSIA (FELANIA) ADAMSI*.

*Mysia (Felania) adamsi*, Angas, *ante*, p. 910, Pl. XLIV. f. 9.

A depressed, orbicularly elongate, shining white species. Length 6 lines. Dredged in deep water. Port Jackson.

95. \**MYSIA (FELANIA) JACKSONENSIS*.

*Mysia (Felania) jacksonensis*, Angas, *ante*, p. 910, Pl. XLIV. f. 10.

Of a pale rosy flesh-colour, covered with a light-greenish epidermis. Length 4 lines. Dredged in Middle Harbour.

FAM. LASEIDÆ.

96. *LASEA SCALARIS*.

*Poronia scalaris*, Phil.

A minute shell, broadly concentrically ribbed, having somewhat the aspect of a *Venus*. Length 2 lines. Gregarious, in crevices of rocks at low water in Port Jackson.

97. *LASEA AUSTRALIS*.

*Poronia australis*, Souv. Journ. de Conch. 1863, p. 287, pl. 12. f. 8.

Larger than the preceding, nearly smooth, and tinged with rose-violet at the margins. Length 3 lines. In crevices of rocks, at low water, Port Jackson; New Caledonia (Montrouzier).

98. *KELLIA ROTUNDA*.

*Erycina rotunda*, Desh. P. Z. S. 1855, p. 181.

A small, horny, triangularly orbicular species. Length 4 lines. Port Jackson; Newcastle, New South Wales; and Moreton Bay.

99. *KELLIA CYCLADIFORMIS*.

*Erycina cycladiformis*, Desh. Trait. Élém. pl. 11. f. 6-9.

More oblong than the preceding, pearly white, with a thin olivaceous epidermis. Length 5 lines. Port Jackson.

## Fam. LEPTONIDÆ.

100. \**LEPTON ADAMSI*.

*Lepton adamsi*, Angas, *antea*, p. 910, Pl. XLIV. f. 11.

A very beautiful species, triangularly ovate, of a pearly white, with the anterior and posterior sides finely shagreened and smooth in the middle; the posterior margin widely plicate. Length  $6\frac{1}{2}$  lines. Port Jackson.

## Fam. GALEOMMIDÆ.

101. *SCINTILLA STRANGEI*.

*Scintilla strangei*, Desh. P. Z. S. 1855, p. 181.

A thin, semipellucid, white, shining, transversely ovate shell. Found nestling under rocks and stones at very low spring tides in Port Jackson. Length 9 lines. This is one of the largest species of the genus *Scintilla*, which was founded by M. Deshayes, and now includes nearly fifty species.

102. *SCINTILLA ANOMALA*.

*Scintilla anomala*, Desh. P. Z. S. 1855, p. 181.

A small, rounded, and somewhat flattened, thin, shining, transparent white species. Found under stones at low water. Length 4 lines. M. Deshayes's types in the Cumingian collection are from Borneo.

## Fam. ASTARTIDÆ.

103. \**GOULDIA AUSTRALIS*.

*Gouldia australis*, Angas, P. Z. S. 1865, p. 459.

A little subtriangular shell of a purplish-fawn colour, sometimes faintly two-rayed, with the umbones darker, having externally the aspect of a minute *Venus*. Dredged in Port Jackson in 5 fathoms. Length 3 lines.

104. *MYTILICARDIA EXCAVATA*.

*Cardita excavata*, Desh. P. Z. S. 1852, p. 100, pl. 17. f. 1-3.

An elongately transverse shell, broadly radiately ribbed, the ribs armed with vaulted projecting scales. Found under stones at low water. Length 1 inch 2 lines.

## Fam. MYTILIDÆ.

## Subfam. MYTILINÆ.

105. *MYTILUS (AULACOMYA) HIRSUTUS*.

*Mytilus hirsutus*, Lam. Anim. sans Vert. vii. p. 38; Reeve, Conch. Icon. *Mytilus*, pl. 3. f. 8.



Dark brown, elevately radiately striated throughout, and clothed with a long fibrous epidermis, the shafts of which are beset with small prickly spines. Amongst rocks and under stones at low water. Length  $2\frac{1}{2}$  inches. This species is found also in South Australia and New Zealand. The interior is iridescent green and purple.

106. MYTILUS DUNKERI.

*Mytilus dunkeri*, Reeve, Conch. Icon. *Mytilus*, pl. 5. f. 17.

? *Mytilus planulatus*, Lam.

This species is so like *M. galloprovincialis*, Lam., that it may be regarded as its southern analogue. Length  $2\frac{3}{4}$  inches. New South Wales, Port Philip, and Tasmania.

Subfam. CRENELLINÆ.

107. CRENELLA (MODIOLARIA) STRIGATA.

*Modiola strigata*, Hanley, P. Z. S. 1844, p. 15.

A pretty species, of a greenish horn-colour, richly painted with zigzag purplish-brown markings, and radiately striated at the anterior and posterior sides. Length 6 lines. Dredged in sandy mud in Port Jackson. Mr. Reeve, in the 'Conch. Icon.' has erroneously given the description and figure of a totally distinct shell as representing Mr. Hanley's *M. strigata*; it is a species of *VolSELLA* from the Philippine Islands, for which I would propose the name *VolSELLA reevei*. *M. concinna*, Dunker, is probably a variety of *M. strigata*.

108. \*CRENELLA (MODIOLARIA) BARBATA.

*Modiolaria barbata*, Angas, *anted*, p. 911, Pl. XLIV. f. 12.

A small oblong ovate species, with the epidermis long, thick, and fibrous posteriorly, having somewhat the aspect of *Modiola opifex*, Say, from Brazil. From the "Seven-mile" beach, Botany Bay. Length 5 lines.

109. PERNA AUSTRALIS.

*Modiola australis*, Gray, Appendix to King's Voy.; Reeve, Conch. Icon. pl. 5. f. 21.

Not unlike *M. tulipa*, Lam. The young shells are prettily tinted with yellow and crimson. Common on the Australian coasts generally. Length 3 inches.

110. PERNA GLABERRIMA.

*VolSELLA glaberrima*, Dunker, P. Z. S. 1856, p. 363.

*Modiola glaberrima*, Reeve, Conch. Icon. *Modiola*, pl. 8. f. 48.

A somewhat triangularly elongated, shining, thin, horny shell, banded and lined with bronze-purple and green. This species spins a sort of nidus, in which it dwells in black mud in Parramatta River. Dredged at 6 fathoms. Length 2 inches.

## Fam. VULSELLIDÆ.

## 111. VULSELLA TASMANICA.

*Vulsella tasmanica*, Reeve, Conch. Icon. *Vulsella*, pl. 1. f. 3.

A rusty-brown species of irregular growth, covered with minute flattened scales arranged in concentric ridges. In sponges &c., Port Jackson. Length 1 inch.

## Fam. MODIOLARCIDÆ.

## 112. MODIOLARCA SUBTORTA.

*Modiolarca subtorta*, Dunker, P. Z. S. 1856, p. 365.

*Modiola subtorta*, Reeve, Conch. Icon. pl. 10. f. 70.

A small, brown, trapezoid shell, with the valves unequal and slightly twisted. Cook's River, Botany Bay. Length 4 lines.

## Fam. AVICULIDÆ.

## 113. AVICULA PULCHELLA.

*Avicula pulchella*, Reeve, Conch. Icon. *Avicula*, pl. 8. f. 22.

A semitransparent, horny species, painted with more or less interrupted reddish flames radiating from the umbones. Attached to sea-weed, in deep water, Botany Bay and Middle Harbour. Length 1 inch.

## 114. MARGARITIFERA FIMBRIATA.

*Avicula fimbriata*, Reeve, Conch. Icon. *Avicula*, pl. 9. f. 25.

A very variable species, both in colour and sculpture. Sometimes it is nearly smooth, at others broadly furbelowed towards the margin with long spout-shaped laminar scales. It is flattened, very broad at the upper part, and squarely ovate. The colour varies from dark horn or purple to whitish, more or less rayed with irregular purple bands and blotches. The interior is brilliantly nacreous. The *Avicula placunoides*, Reeve (Conch. Icon. pl. 17. f. 68), is probably only a variety of this species. Found under pieces of rock at low water, at Middle Harbour and Watson's Bay. Length 3 inches.

## 115. MALLEUS ALBUS.

*Ostrea malleus-albus*, Chem.

The ordinary "Hammer-oyster" of Australia, which ranges from Port Lincoln to Moreton Bay. It occurs on the sandy flats in Broken Bay; and I obtained a young specimen in Middle Harbour, Port Jackson.

## 116. PINNA ZEYLANICA.

*Pinna zeylanica*, Gray, Appendix to Dieffenbach's Travels.

This common Australian species is found at Brisbane Water.

## Order PECTINACEÆ.

## Fam. TRIGONIIDÆ.

## 117. TRIGONIA PECTINATA.

*Trigonia pectinata*, Lam. Ann. du Mus. iv. p. 355, pl. 67.

*Trigonia lamarki*, Gray.

This beautiful shell, so remarkable for the brilliant purple, silver, or orange nacre of the interior of its valves, was at one time easily obtained by the dredge on the "Sow and Pigs" bank, in Port Jackson. The wreck of a coal-laden vessel has, however, interfered with its favourite resort, and it is now more difficult to procure than formerly. Length 1 inch 2 lines.

The valves both of this species and *T. margaritacea*, Lam. (from Bass's Straits), are manufactured into elegant brooches and ear-ornaments by the London jewellers.

## 118. TRIGONIA STRANGEI.

*Trigonia strangei*, A. Adams, P. Z. S. 1852, p. 91.

An extremely rare species, at once distinguished by the wart-like nodules which cover the ribs. It was dredged near the entrance to Port-Jackson Heads; in deep water, by the late Mr. Strange, whose name it bears. A few odd valves, much worn, have been washed ashore at Long Bay and on the beach at Wollongong. Length  $1\frac{1}{2}$  inch.

## Fam. ARCIDÆ.

## Subfam. ARCINÆ.

## 119. BARBATIA FASCIATA.

*Arca fasciata*, Reeve, P. Z. S. 1844; Conch. Icon. pl. 15. f. 99.

A remarkably flattened species, rust-stained, and with an erect bristly epidermis at the posterior end. Found under stones and in the crevices of rocks at low water. Length 1 inch 9 lines.

## 120. BARBATIA (ACAR) PUSILLA.

*Arca pusilla*, Sow. P. Z. S. 1833.

A small whitish species, belonging to the same group as *A. divaricata*. Common under stones at low water about Watson's Bay and Middle Harbour. Length 6 lines.

## 121. ANOMALOCARDIA TRAPEZIA.

*Arca trapezia*, Desh. Mag. de Zoologie.

*Arca lobata*, Reeve, P. Z. S. 1844; Conch. Icon. pl. 3. f. 19.

This is the common "Mud-cockle" of the colonists. It is found abundantly half buried in the mud in most of the sheltered bays of Port Jackson, at low water, especially in Woolloomooloo and Rush-cutter's Bays, and along the Parramatta River. Length 3 inches.

## Subfam. AXININÆ.

## 122. AXINIA HOLOSERICA.

*Pectunculus holosericus*, Reeve, P. Z. S. 1843; Conch. Icon. pl. 4. f. 18.

This species is covered with an olive epidermis of a peculiar close velvety softness. Dredged at Watson's Bay and inside the South Reef, &c. Length 2 inches.

## 123. AXINIA GRAYANA.

*Pectunculus grayanus*, Dunker, P. Z. S. 1856, p. 357.

Somewhat resembling the European *A. glycimeris* in character, but more globose, with the valves superficially longitudinally striated. Newcastle, Port Stephen, and cast ashore on the sands at the mouth of the Manning River. Length 1 inch 9 lines.

## 124. AXINIA (PECTUNCULUS) TENUICOSTATUS.

*Pectunculus tenuicostatus*, Reeve, P. Z. S. 1843; Conch. Icon. *Pectunculus*, pl. 6. f. 35.

The valves of this species are covered with thread-like ribs, the interstices of which are finely grooved, the roots of epidermis springing from them in rows. I have only hitherto met with young shells of this species in Port Jackson, my adult specimens being from Moreton Bay. Dredged off the "Sow and Pigs" reef. Length of adult examples 1 inch 4 lines.

## Fam. NUCULIDÆ.

## 125. NUCULA STRANGEI.

*Nucula strangei*, A. Ad. Thes. Conch. pl. 229. f. 125.

A very oblique species, of a pale olive-green colour, smooth and shining. Dredged in Port Jackson and Port Stephen. Length 5 lines.

## 126. \*NUCULA CONSOBRINA.

*Nucula consobrina*, A. Ad. & Angas, P. Z. S. 1863, p. 427. sp. 11.

Less oblique than the preceding, of a dull yellowish olive, with the valves more or less concentrically ridged and finely crenate. Dredged in Parramatta River and Port Stephen. Length  $3\frac{1}{2}$  lines.

## Fam. LEDIDÆ.

## 127. LEDA DOHRNI.

*Leda dohrni*, Hanley.

A pretty little horn-coloured species, with the valves nearly smooth anteriorly, and ridged, keeled, and birostrate posteriorly. Dredged on the "Sow and Pigs" bank. Length 3 lines.

## Fam. PECTINIDÆ.

## 128. PECTEN TEGULA.

*Ostrea tegula*, Wood, Index Test. Supp. p. 7, pl. 2; Reeve, Conch. Icon. pl. 30. f. 136.

This fine species is distinguished by the irregular foliaceous scales that ornament the ribs. It varies considerably in colour, from yellowish orange, purplish grey, and dull red, to a fine rich chocolate-brown, with whitish scratch-like lines towards the umbones. Found amongst rocks and under stones at low water in Port Jackson. Length  $2\frac{1}{4}$  inches. It is also met with at Moreton Bay and New Caledonia.

## 129. VOLA FUMATA.

*Pecten fumatus*, Reeve, Conch. Icon. *Pecten*, pl. 7. f. 32.

The right valve is very convex and broadly ribbed; and the left valve concavely flattened, rayed with twelve narrow, raised, rather distant ribs, and immersed in the right valve. The deep smoky-purple colouring and the produced recurved beak of the right valve are peculiar. Dredged in sandy mud in Lane Cove and Middle Harbour. Length  $3\frac{1}{4}$  inches.

## Fam. RADULIDÆ.

## 130. RADULA LIMA.

*Ostrea lima*, Linn.

*Lima squamosa*, Lam.; Sow. Thes. Conch. pl. 21. f. 17, 18.

This widely distributed species is not uncommon amongst rocks and under stones at low water in Port Jackson, and at Wollongong and Port Stephen, &c. Length 2 inches.

## 131. RADULA (LIMATULA) BULLATA.

*Ostrea bullata*, Born.

*Lima fragilis* (var. *b*), Lam.; Sow. Gen. of Shells, f. 3.

A narrow, inflated, nearly equilateral, white shell, longitudinally ridged, with the ears almost equal. Under large stones and slabs of rock at low water in Watson's Bay and Middle Harbour &c. Length  $1\frac{1}{2}$  inch.

The animals of *L. bullata* form a sort of nest amongst the fragments of broken shells and corals in the rock-pools, where they dwell gregariously.

## Fam. ANOMIIDÆ.

## 132. PLACUNANOMIA (MONIA) IONE.

*Placunanomia ione*, Gray.

This fine species differs from *P. macrochisma*, Desh. (from the Gulf of Tartary), in having the plug large and triangular. It is found attached to the under surface of rocks at low water near Port-



Jackson Heads. Length 2 inches 4 lines. The interior of the lower valve is of a peculiar horny green colour.

Fam. OSTREIDÆ.

133. OSTREA PURPUREA.

*Ostrea edulis*, var. *purpurea*, Hanley, Conch. Miscel. pt. 3.

This is the common "Mud-oyster," which supplies the Sydney markets. Mr. Hanley regards it as a variety of *Ostrea edulis*, Linn., a species that varies extremely according to its station in salt or brackish waters. On careful comparison of the Port Jackson shells (especially the young) with those of Europe, I am of opinion that the former may be separated as a distinct species under the name *purpurea*. The laminate scales are much larger, more regularly frilled, and the valves are dentate at the margins; the purple colouring prevails more or less throughout, and in the young shells exhibits a radiate style of painting. It occurs in various parts of Port Jackson and the other harbours of New South Wales. My largest specimen is from Johnson's Bay, and measures 6 inches across.

134. OSTREA MORDAX.

*Ostrea mordax*, Gould, Proc. Boston Nat. Hist. Soc. iii. p. 346; United States Exploring Expedition (Mollusca), pl. 43. f. 575 *a, b*.

The "Rock-oyster" of the colonists. "The horizontal digitations of the upper valve fitting into the erect canine teeth of the lower valve, together with the denticles within, and the black elevated cicatrice, may serve to identify this species."—*Gould*. The interior is white, stained with blackish purple towards the margins. It is excellent eating and of a delicious flavour. Common everywhere, attached to rocks between tide-marks. Length 2 inches; breadth 1 inch 7 lines.

135. OSTREA CIRCUMSUTA.

*Ostrea circumсата*, Gould, Proc. Bost. Nat. Hist. Soc. iii. p. 346; United States Exploring Expedition, pl. 43. f. 576 *a, b*.

This is a species of rare occurrence; it is of a narrow elongated form, denticulated and tinged with violet around the margin. The interior is pearly white, with the scar of the adductor muscle violet. Botany Bay. Length 2 inches; breadth 1 inch.

136. \*OSTREA VIRESCENS.

*Ostrea virescens*, Angas, *anted*, p. 911, Pl. XLIV. f. 13.

A handsome species, very orbicular, frilled round the margins, with the cardinal area large, flat, and triangular, and the interior of a peculiar green hue. Attached to rocks and madrepores at low tides in Watson's Bay. Length  $1\frac{1}{2}$  inch.

## Class BRACHIOPODA.

## Fam. TEREBRATULIDÆ.

## Subfam. TEREBRATULINÆ.

## 137. WALDHEIMIA FLAVESCENS.

*Terebratula flavescens*, Lam. Anim. sans Vert. vii. p. 330.

*T. australis*, Quoy et Gaim.

This fine species varies considerably in form and sculpture. It is found gregarious, attached to the under surface of flat-shelving rocks at low tide, in many parts of Port Jackson, especially at that extremity of the Government domain known as "Lady Macquarrie's Chair," where I have obtained a large number of specimens. Length  $1\frac{1}{2}$  inch.

## Subfam. MAGASINÆ.

## 138. MAGAS CUMINGI.

*Terebratella? cumingi*, Davidson, P. Z. S. 1852, p. 78, pl. xiv. f. 10-16.

Dredged in deep water outside Port Jackson Heads. Length 5 lines. [New Zealand (Cuning).] An interesting recent analogue of a fossil form abundant in the sandstone cliffs of the Murray.

## 139. KRAUSSIA LAMARCKIANA.

*Kraussia lamarchiana*, Davidson, P. Z. S. 1852, p. 80, pl. xiv. f. 22, 23.

This pretty little species, which is strongly radiately ribbed, occurs attached to the under surface of stones in most parts of Port Jackson. Length 4 lines.

## Fam. LINGULIDÆ.

## 140. LINGULA HIANS.

*Lingula hians*, Swainson, Zool. Illus. ii. pl. 2.

This species may be distinguished by its sharply pointed, elevated, widely gaping beaks; the valves are semitransparent, horny, and of a bright pale green tinged with rust-colour. In sandy mud, Middle Harbour. Length  $1\frac{1}{2}$  inch. It occurs also at the Figis, New Caledonia, China, and the Philippines.

## 7. On some New or imperfectly known Fishes of Madras.

By Surgeon FRANCIS DAY, F.Z.S., F.L.S., Principal Medical Storekeeper, Madras Army, &c.

Among the fishes lately brought to me here at Madras several appear to be new or imperfectly described species; and I accordingly beg permission to lay detailed descriptions of them before the Society.

## APOGON NOTATA, sp. nov.

B. vii. D.  $6\frac{1}{9}$ . P. 13. V.  $1\frac{1}{5}$ . A.  $2\frac{1}{16}$ . C. 17. L. r. 20.

Length of specimens up to 3 inches.

Length of head  $\frac{4}{13}$ , of pectoral  $\frac{1}{6}$ , of base of first dorsal  $\frac{1}{8}$ , of base of anal  $\frac{1}{4}$ , of caudal  $\frac{1}{6}$  of the total length. Height of head  $\frac{1}{5}$ , of body  $\frac{1}{3}$ , of first dorsal  $\frac{1}{10}$ , of second dorsal  $\frac{1}{5}$ , of ventral  $\frac{1}{8}$ , of anal  $\frac{1}{8}$  of the total length.

Eyes circular, diameter  $\frac{1}{2}$  of length of head;  $\frac{1}{2}$  a diameter apart,  $\frac{1}{3}$  of a diameter from end of snout.

Body rather elongated and compressed. Mouth moderately wide, lower jaw slightly the longest; the posterior extremity of the maxilla reaches to beneath the centre of the orbit. No spines around the margin of the orbit. Angle of præoperculum rather produced and rounded, lower limb with a single line of serrations just above the lower edge of the horizontal limb, which, however, is entire. Operculum without a spine, but ending in a soft prolongation.

Teeth villiform, in numerous closely set rows in both jaws, but smallest in the upper; a row of rather larger teeth in the palatines, and a small patch on the vomer.

*Fins.* First dorsal with very weak spines, the third of which is the longest, whilst the interspinous membrane is rather deeply emarginate. A short interspace exists between the two dorsal fins; the second dorsal highest anteriorly. First anal spine nearly half the length of the second, which is two-thirds that of the first ray.

Scales deciduous.

Lateral line nearly straight.

*Colours.* White, with a pink tinge along the abdomen and on the fins. A rather large black finger-mark on the lateral line at the root of the caudal fin. Opercles silvery.

In Malabar I never procured an *Apogon*, but the *Ambassis* abounds. In Madras, on the contrary, the former appear to be numerous, whilst the latter are comparatively rare.

## PRISTIPOMA NEILLI, sp. nov.

B. vii. D.  $12\frac{1}{4}$ . P. 17. V.  $1\frac{1}{5}$ . A.  $3\frac{1}{7}$ . C. 19. L. l. 50. L. tr.  $10\frac{1}{15}$ .

Length of specimen 7 inches.

Length of head  $\frac{1}{4}$ , of pectoral  $\frac{1}{4}$ , of base of dorsal spines rather more than  $\frac{1}{4}$ , of base of dorsal rays  $\frac{1}{5}$ , of base of anal  $\frac{1}{6}$ , of caudal  $\frac{1}{5}$  of the total length. Height of head  $\frac{1}{3}$ , of body rather more than  $\frac{1}{3}$ , of dorsal spines  $\frac{1}{7}$ , of dorsal rays  $\frac{1}{9}$ , of ventral  $\frac{1}{5}$ , of anal spines  $\frac{2}{15}$ , of anal rays  $\frac{1}{6}$  of the total length.

*Eyes.* Upper margin near the profile, diameter  $\frac{1}{3}$  of length of head;  $\frac{3}{4}$  of a diameter apart, nearly 1 diameter from end of snout.

Body ovoid, moderately compressed. A rather considerable rise from the snout to the base of the dorsal fin.

Jaws of about equal length, a deep groove under the symphysis of the lower jaw, with a small facet on either side of its anterior portion.

The posterior extremity of the maxilla extends nearly as far as to beneath the anterior margin of the orbit. The posterior limb of the intermaxillaries extends to opposite the anterior margin of the orbit. Præorbital two-thirds as wide as the orbit. Præoperculum a little emarginate, its angle slightly produced, serrated in its whole extent, but coarsest at the angle, the lower limb two-thirds as long as the vertical one, and with some few serrations along its posterior part.

Teeth villiform, in several rows anteriorly, becoming a single one posteriorly, some also on vomer and palate.

*Fins.* Dorsal spines strong, every alternate one broadest, interspinous membrane slightly emarginate; fourth spine the longest; last spine three-fourths as high as the first ray. Pectoral pointed. Ventral spine not very strong, its first ray with a short filamentous prolongation. First anal spine weak, and one-third as long as the second, which is strong and one-fourth longer than the third, which is striated anteriorly and laterally, and has a smooth keel anteriorly half the width of the spine. Caudal slightly lunated.

Scales in horizontal rows, except to the first seven dorsal spines, to which they ascend irregularly upwards and backwards. There are some fine scales between the dorsal and anal rays.

Lateral line follows the course of the back.

*Colours.* Greyish, becoming white along the abdomen. A brilliant yellow band passes along the centre of a row of scales from opposite to the centre of the orbit to the centre of the base of the caudal fin. A similar one passes a short distance along the centre of the row above it. Dorsal and caudal fins greyish, soft dorsal with a light margin. Pectorals, ventrals, and anal yellowish. Eye golden.

I have named this species after my esteemed correspondent A. C. B. Neill, Esq., F.Z.S.

*PRISTIPOMOIDES AUROLINEATUS*, sp. nov.

B. vi. D. 10/14. P. 19. V. 1/5. A. 3/12. C. 15. L. 1. 72. L. tr. 8/16.

Length of specimen  $3\frac{5}{10}$  inches.

Length of head  $\frac{4}{17}$ , of pectoral  $\frac{1}{5}$ , of base of dorsal spines  $\frac{1}{5}$ , of base of dorsal rays  $\frac{1}{5}$ , of anal  $\frac{2}{17}$ , of caudal rather above  $\frac{1}{5}$  of the total length. Height of head  $\frac{1}{5}$ , of body  $\frac{2}{7}$ , of dorsal spines  $\frac{1}{10}$ , of dorsal rays  $\frac{1}{12}$ , of ventral  $\frac{1}{6}$ , of anal spines  $\frac{1}{10}$ , of anal rays  $\frac{1}{12}$  of the total length.

Eyes circular, upper margin close to the profile, diameter  $\frac{1}{3}$  of length of head;  $\frac{3}{4}$  of a diameter apart,  $\frac{1}{2}$  a diameter from end of snout.

Body rather elongated and compressed; head slightly depressed.

Mouth anterior, lower jaw the longest; posterior extremity of the maxilla rather wide, extending to beneath the anterior third of the orbit; the posterior limb of the intermaxillaries likewise extends backwards in the central line to opposite to the same place. Præorbital long, narrow, and at least three times as long as wide, and with elevated striæ upon it. Præoperculum wide, its horizontal wider than its vertical limb; both striated at their edges, and irregularly serrated.

PROC. ZOO. SOC.—1867, No. LX.

Operculum with a moderately strong spine. Two rows of scales upon the cheeks. No pores on the lower jaw, but a long very shallow central groove under the symphysis.

Teeth villiform, in one or two rows, the outer being the largest and rather recurved, especially about the centre of both jaws; none in the centre of the upper jaw, nor on the vomer or palate.

*Fins.* Dorsal spines weak, third and fourth the longest; interspinous membrane very slightly emarginate; rays all about equal length. Pectoral rather pointed, reaching to opposite to the anus. Ventral pointed. First anal spine one-quarter the length of the second, which is of equal strength, but slightly shorter than the third. Caudal deeply lobed, the lower being the largest and longest.

Scales ctenoid; a few present along the base of the dorsal and anal fins, which have shallow grooves, also on the caudal almost to its termination.

Lateral line in the upper fourth of the body, following the curve of the back.

*Colours.* Above the lateral line a beautiful light lake, whilst from the eye to the root of the tail proceeds a brilliant shining golden band three scales deep near the head, decreasing in width to one at the base of the tail; below this band the colours are pinkish white. Ventrals white, the other fins pinkish white, the caudal being tipped with black.

UPENEOIDES GUTTATUS, sp. nov.

B. iv. D.  $7\frac{1}{8}$ . P. 15. V.  $1\frac{1}{5}$ . A.  $2\frac{2}{7}$ . C. 15. L. l. 32. L. tr.  $3\frac{1}{5}$ .

Length of specimens to  $4\frac{7}{10}$  inches.

Length of head rather above  $\frac{1}{4}$ , of pectoral  $\frac{1}{7}$ , of base of first dorsal  $\frac{1}{7}$ , of base of second dorsal  $\frac{1}{9}$ , of base of anal  $\frac{1}{12}$ , of caudal  $\frac{1}{5}$  of the total length. Height of head  $\frac{1}{6}$ , of body  $\frac{1}{4}$ , of first dorsal  $\frac{1}{6}$ , of second dorsal  $\frac{1}{6}$ , of ventral nearly  $\frac{1}{4}$ , of anal  $\frac{1}{9}$  of the total length.

Eyes transversely oval, the upper margin near the profile, diameter  $\frac{2}{7}$  by  $\frac{1}{5}$  of length of head;  $1\frac{1}{4}$  transverse diameter from end of snout, nearly 1 transverse diameter apart.

Body rather elongated, and with a considerable rise from the snout to above the orbits.

Snout rather obtuse; the posterior extremity of the maxilla extends to beneath the anterior margin of the orbit. The barbles extend to beneath the posterior margin of the præoperculum, which last is entire. Præorbital entire, its width equal to the transverse diameter of the orbit.

Teeth in five villiform rows in either jaw, on vomer and palate.

*Fins.* First dorsal triangular, the second spine the longest, interspinous membrane very slightly emarginate. Four rows of scales between the termination of the first and the commencement of the second dorsal fins, the latter of which is twice as high anteriorly as posteriorly, its spine half the height of the first ray. First anal spine minute; the second more than half as long as the first



ray; the fin twice as high anteriorly as posteriorly. Caudal deeply lobed.

Scales in parallel horizontal rows.

Lateral line follows the curve of the back, in the upper fourth of the body. It consists of a single tube in each scale, with branching roots, which are most distinct superiorly.

Air-bladder absent.

*Colours.* Chestnut along the back, becoming golden on the abdomen. Head reddish; a silvery stripe from the eye to the centre of the caudal fin, with a row of red spots above it, and another below it. Two reddish bars cross both the dorsal fins. Caudal with four oblique reddish bars across the upper lobe, whilst the lower is reddish and without bars. Pectorals, ventrals, and anal fins yellowish. Eye silvery.

#### OTOLITHUS ANEUS, Bloch.

B. vii. D. 10  $\frac{1}{24}$ . P. 17. V.  $1\frac{1}{5}$ . A.  $2\frac{2}{7}$ . C. 17. L. 1. 52.  
L. tr.  $9\frac{1}{15}$ .

Length of specimens up to  $8\frac{5}{10}$  inches.

Length of head  $\frac{2}{7}$ , of pectoral  $\frac{2}{9}$ , of base of first dorsal  $\frac{2}{11}$ , of base of second dorsal  $\frac{2}{9}$ , of base of anal  $\frac{1}{14}$ , of caudal  $\frac{1}{6}$  of the total length. Height of head  $\frac{2}{9}$ , of body nearly  $\frac{2}{7}$ , of first dorsal  $\frac{2}{8}$ , of second dorsal  $\frac{1}{10}$ , of ventral  $\frac{1}{7}$ , of anal  $\frac{1}{10}$  of the total length.

*Eyes.* Diameter  $\frac{1}{4}$  of length of head; 1 diameter apart, 1 diameter from end of snout.

Body rather compressed, and about equally convex along both its dorsal and abdominal profiles.

Mouth oblique, the posterior extremity of the maxilla extending to beneath the centre of the orbit; interorbital region rather convex. Both vertical and horizontal margins of the præoperculum crenulated, angle slightly rounded. Two weak spines on operculum.

*Teeth.* An external row of ten or twelve conical and rather recurved teeth in the upper jaw, and an internal row of villiform teeth which are strongest in the posterior portion of the jaw. Also villiform teeth in the lower jaw with some conical ones intermixed, which are largest opposite to the symphysis. There are no large canines as in the *O. ruber*.

*Fins.* First dorsal somewhat triangular; the second dorsal parallel to the back. Pectoral pointed, extending to opposite to the third or fourth dorsal ray. The anal commences under the posterior third of the second dorsal. Caudal cut rather square. Dorsal spines weak, the first short, second and third the longest; interspinous membrane very slightly emarginate. Dorsal rays only branched in their upper third. Second anal spine the longest, but rather weak; it is two-thirds the length of the first ray.

Scales over head, opercles, cheeks, and præorbitals passing in rows backwards and upwards above the lateral line, and in much the same direction below it.

Lateral line in upper fourth of body, in single tubes with branching roots superiorly, and extending along the tail to its extremity.

*Colours.* Silvery grey, becoming dirty white along the abdomen. First dorsal tipped with black; second dorsal greyish, lightest along its centre. Pectorals, ventrals, and anal yellowish. Caudal tinged with grey.

I have referred this to Bloch's species, although he gives the dorsal formulary as follows:—D.  $8\frac{1}{24}$ ; but his engraving shows D.  $9\frac{1}{24}$ , and the first short spine is evidently omitted. This would give D.  $10\frac{1}{24}$ , as I find to be the case at Madras. His specimen was received from Tranquebar.

**GOBIUS BREVIFILIS, C. & V.**

B. iv. D.  $6\frac{1}{8}$ . P. 17. V. 6. A.  $1/9$ . C. 9. L. 1. 21. L. tr. 12.

Length of specimens to 4 inches.

Length of head  $\frac{1}{4}$ , of pectoral  $\frac{1}{6}$ , of base of first dorsal nearly  $\frac{1}{7}$ , of base of second dorsal  $\frac{1}{6}$ , of base of anal  $\frac{1}{7}$ , of caudal  $\frac{1}{5}$  of the total length. Height of head  $\frac{1}{6}$ , of body  $\frac{1}{4}$ , of first dorsal  $\frac{1}{4}$ , of second dorsal  $\frac{1}{7}$ , of ventral  $\frac{1}{6}$ , of anal  $\frac{1}{10}$  of the total length.

*Eyes.* Diameter  $\frac{1}{3}$  of length of head;  $\frac{2}{3}$  of a diameter from end of snout,  $\frac{1}{5}$  of a diameter apart.

Body rather compressed; profile from the snout to above the orbit forming almost one-fourth of a circle.

Gape of mouth rather wide, and cleft deep, the posterior extremity of the maxilla extending to beneath the anterior third of the orbit. Snout obtuse, rounded. Interorbital space very narrow, and slightly concave. Occipital crest indistinct. Posterior limb of præoperculum almost vertical, and not quite so long as the horizontal one; angle rounded and entire.

Teeth in several pointed villiform rows in both jaws; an external row of larger recurved teeth in the anterior third of either jaw.

*Fins.* Base of pectoral wide; all the rays branched, the central ones the longest. The second spine of the first dorsal elongated and filiform, as is also the third, but not to so great an extent; interspinous membrane moderately emarginate. Rays of the second dorsal fin of about equal height along its whole extent. Eight rows of scales between the posterior extremity of the second dorsal and the base of the caudal. Ventrals united. Anal low, its last ray slightly elongated; and seven rows of scales between its base and that of the caudal, which last is wedged-shaped, the central rays being the longest.

Scales finely ctenoid, none on the head.

*Colours.* Buff clouded with black; a large black blotch extending from between the two dorsals to the middle of the body, three more under or just beyond the second dorsal, and a large black blotch at the root of the tail. First dorsal with two rows of black spots; second dorsal with three rows. Caudal irregularly spotted, and with a dark margin. Pectorals buff-colour. Ventrals slate-colour. Anal buffy brown, edged with black.

*APOCRYPTES PUNCTATUS*, sp. nov.

B. iv. D. 5/25. P. 15. V. 6. A. 24. C. 15.

Length of specimens up to 6 inches.

Length of head  $\frac{1}{5}$ , of pectoral  $\frac{1}{10}$ , of base of first dorsal  $\frac{1}{13}$ , of base of second dorsal  $\frac{2}{5}$ , of base of anal  $\frac{1}{3}$ , of caudal  $\frac{1}{6}$  of the total length. Height of head  $\frac{1}{5}$ , of body  $\frac{1}{5}$ , of first dorsal  $\frac{2}{5}$ , of second dorsal  $\frac{1}{9}$ , or ventral  $\frac{1}{9}$ , of anal  $\frac{1}{27}$  of the total length.

Eyes elevated, interorbital space concave ;  $1\frac{1}{2}$  diameter from end of snout, nearly 1 diameter apart.

Gape of mouth wide, cleft deep ; the posterior margin of the maxilla extending to beneath the posterior margin of the orbit. Lower jaw broad, elevated at the symphysis. No crest on the head. Opercles unarmed. On either side of the snout the skin is extended into a slight lobe.

Teeth in a single row in the lower jaw, directed outwards and curved upwards at their extremities. A single row also in the upper jaw, with four to six canines in the centre, the external of which on either side is the largest.

*Fins.* Ventrals united, unattached to abdomen, except at their base ; they arise under the middle of the operculum. Pectoral with a broad fleshy base ; it commences posterior to the opercles ; its outer rays are shorter than its central ones, which are the longest. The first dorsal consists of elongated, filiform spines, with a deeply emarginate interspinous membrane. The distance between the posterior end of the first dorsal and the commencement of the second dorsal equals the length of its base. The first five rays of the second dorsal shorter than the remainder ; its last ray extends as far as the base of the caudal fin. Anal rays all branched and short. Caudal with very short external rays, its central ones being the longest.

Scales minute over head, and rather smaller in the anterior than in the posterior half of the body.

*Colours.* Greenish, with seven or eight black vertical bands descending from the back as low as the abdomen, which is of a reddish-brown colour. The whole of the body covered with opaque but bright blue spots, which are smaller and rounder on the head and at the base of the pectoral fins. Dorsal fins spotted in the same manner, those on the second dorsal being larger than those on the first. Pectoral orange, with a black edge. Caudal and anal blackish. Ventrals with a purplish tinge.

This fish climbs up rocks, and even on to pieces of wood ; living in shallow estuaries, it is drowned in deep water. On land it progresses rapidly by means of its pectoral fins and tail, and snaps at anything which is placed near it. It is not uncommon.

*PLATACANTHUS MACULATUS*, sp. nov.B. iii. D. 3/27. P.  $\frac{5}{1}$ . V. 8. A. 3/6. C. 21.

Length of specimen 2 inches.

Length of head  $\frac{2}{11}$ , of pectoral  $\frac{2}{11}$ , of base of dorsal  $\frac{1}{4}$ , of base of

anal  $\frac{1}{10}$ , of caudal  $\frac{1}{5}$  of the total length. Height of head  $\frac{1}{3}$ , of body  $\frac{1}{6}$ , of dorsal  $\frac{1}{6}$ , of ventral  $\frac{1}{9}$ , of anal  $\frac{1}{9}$  of the total length.

*Eyes.* Diameter  $\frac{1}{6}$  of length of head; nearly 1 diameter apart, 2 diameters from end of snout.

Body elongated and slightly compressed, the upper profile ascends considerably from the snout to the commencement of the dorsal fin. No raised adipose keel along the back.

Mouth inferior, overhung by the snout. One pair of cirri on snout, as long as the orbit; two pairs on maxillæ, and two on the lower jaw. A free, bifurcated suborbital spine under the anterior third of the orbit. Anterior nostril tubular, divided by a valve from the posterior.

*Fins.* Pectoral arises under the operculum; it is as long as the head, and terminates at a distance equal to that from the snout to the posterior margin of the orbit from the commencement of the ventral, which does not quite reach the anal. Dorsal arises rather anterior to the termination of the pectoral, and ends just before the commencement of the anal. Dorsal fin highest anteriorly, with an elevation about its centre. Caudal nearly square, but with a slight emargination from its third to its sixth ray. Internal pectoral ray bony, with an enlarged extremity.

Scales minute, covering the body.

*Colours.* Greyish, becoming dirty white below the centre of the body. A dark line passes from the eye to the centre of the tail; along its first half are six black spots, whilst the whole extent of the back is irregularly lineated. Fins yellowish. Dorsal with four dark bands along it. Caudal with three bands, and a black margin. A black mark at the base of the tail, with a smaller one above and another below it.

This pretty little Loach was kept upwards of a month in a vase of water. When at rest it usually remained on the sand or rock-work supported by its two pectoral and its anal fins, its abdomen not touching the ground. When frightened it burrowed under the sand with great rapidity. It consumed animal or vegetable food indifferently, and grew considerably whilst in confinement.

8. Descriptions of some New Australian Freshwater Fishes,  
By GERARD KREFFT, F.L.S., C.M.Z.S., Curator and  
Secretary of the Australian Museum, Sydney, N. S. W.

#### Fam. PERCIDÆ.

#### MIONORUS, n. g.

Seven branchiostegals; all the teeth villiform, without canines; teeth on the vomer and on the palatine bones; tongue smooth. Two dorsals; the first with six, the anal with two spines. The leaves of the head without denticulation. Operculum without spines; scales moderate.

**MIONORUS LUNATUS.**B. 7. D.  $6\frac{1}{9}$ . A.  $\frac{2}{8}$ .

The height of the body is equal to one-third of the total length without caudal; cleft of mouth obliquely running upwards, as in the genus *Iluo*; the length of the head is contained twice and one-half in the total length; the diameter of the eye is less than the length of the snout, and equal to the space between the eyes. The pectorals are rather narrow at the base, with eleven rays, situated just above the ventrals, which are furnished with one spine and five rays. The anal has two spines and nine rays. There are only six spines in the first dorsal, the first of which is the smallest, the last being about as long again as the first; the third spine is the longest, and is but slightly larger than the diameter of the eye. A short space, about the length of the last spine, divides the first from the second dorsal, which has one spine and nine rays. The scales are of moderate size, thirty on the lateral line.

Coloration uniform brownish; all the scales dotted with small black spots forming crescent-shaped and triangular marks on the sides. Caudalis truncated.

*Hab.* Cox's River, County Philip, New South Wales.

**DULES VIVERRINUS.**D.  $\frac{11}{11}$ . A.  $\frac{3}{9}$ . P. 15. V.  $\frac{1}{5}$ . L. lat. 58 to 60.

The height of the body is one-third of the total length (without caudal fin); the diameter of the eye is equal to the length of the snout, as long as the space between the eyes, and nearly one-fourth of the length of the head. There are two spines on the operculum, the lower one with two points. Caudalis truncated; the fourth and fifth dorsal spine longest.

Coloration uniform silvery on the sides; the lateral line divides the brownish and silvery hues; all the scales dotted with fine black spots, those of the sides having a free space in the centre. Fins black-dotted, and the first ray of the ventral fin tapering into a long filament, which is equal to the length of the head.

*Hab.* Murray River and its tributaries.

**Fam. GALAXIE.****GALAXIAS WATERHOUSII.**

D. 11. A. 15. P. 13. V. 7.

Body stout, its depth in front of the dorsal fin being nearly one-eighth of the total length without caudal. The length of the head is one-sixth of the total without caudal, and equal to the height of the body. Eye of moderate size, one-fourth of the length of the head, and equal to the extent of the snout. The length of the pectoral fin is one-third of the space between its root and that of the ventral; the ventrals are of the same length, and almost in the middle between the vent and the root of the pectorals. The anal, if



laid backwards, does not reach the base of the caudal. The distance between the dorsal and caudal fin is much greater than the least depth of the tail.

Coloration uniform brownish ; back and sides finely black-dotted. Operculum with a golden tint.

Total length 7 inches.

*Hab.* Creeks in South Australia.

## 9. On the Geographical Range of *Sennopithecus entellus*.

By Capt. T. HUTTON, C.M.Z.S.

The particular species of Monkey to which the name of Hoo-noomaun now more especially and properly applies is known to naturalists as the *Sennopithecus entellus* ; and notwithstanding the frequent and dogmatic assertions of travellers as to its occurrence throughout all India, from Cape Comorin to the Himalaya, the species is entirely and absolutely restricted within narrow limits to the hot tropical plains of the south-western Gangetic provinces, where, from the degree of protection which its imputed "odour of sanctity" is so well calculated to cast around it, as well as from the numbers in which it frequently occurs, it becomes a perfect nuisance in those parts of the country where the superstitious veneration for it most strongly prevails. In many places, where the natives from religious motives are in the habit of feeding and protecting them, the roofs of the village huts are at certain hours of the day literally crowded with them, and the depredations committed in grain-shops, gardens, and among the neighbouring crops are most destructive and *unsaintlike*.

Mr. Blyth speaks of the frequent occurrence of troops of these Monkeys around Kishnagur in Lower Bengal, and observes that he never met with them eastward of the Hooghlee ; this is a slight error, as Kishnagur is itself to the eastward of that river. If he meant to say that they were not in their *natural habitat* to the eastward of the Hooghlee he would be correct, as the animal was purposely introduced into Kishnagur by devotees. The fact is that Mr. Blyth confounds the Hooghlee with the Jellinghee river, the former originating only in the junction of the Bhagiruttee and Jellinghee a little below Kishnagur, and thence proceeding to Calcutta and the sea. Kishnagur itself is situated on the left bank of the Jellinghee, which bounds the eastern side of the island of Cossimbazaar or Moorshedabad ; and the Bhagiruttee bounds the western side,—both these Gangetic offshoots forming a junction to the south of the island a little below Kishnagur, and about sixty miles or so above Calcutta. The Entellus having been purposely introduced into that locality some years ago proves that the animal is not a native of that side of the river, but is wholly confined by nature to the right banks of the Ganges and Hooghlee. Mr. Blyth likewise remarks with reference to the Entellus ;—"I know of one locality where the whole

numerous community of Bengal Hoonoomauns appears to consist of males only of different ages, from half-grown or less to adults; and the natives of that part say that furious battles are frequent among them; whereas the great majority are females in the other locality that has been spoken of, and it is understood that each male attached to a flock of females allows no other male, even half-grown, to approach them. Though a stream navigable for boats passes through the jungle inhabited by the latter community, or probably series of communities, with plenty of Hoonoomauns on each side of it, the natives of the place informed me that they had never known one to pass across, or, in fact, to enter the water”\*.

There is in this an abundance of credulity on the one side, and of fiction on the other! Cross the water they will not—a proof that Nature restricts them to the range I have herein pointed out. But if all the males remain on one side of a stream and all the females on the other, as this statement would seem to imply, how does Mr. Blyth propose to carry on the great work of Nature? The story is evidently one of those tales in which native shortsightedness is clearly apparent; nay, it contradicts itself; for Mr. Blyth states that in one flock the majority were females, thus admitting the presence of several males, and yet alleges that each male attached to a flock will allow no other male, not even half-grown, to approach the females. The fact appears to be that the troop on one side has evidently been introduced to the locality, while the other is on its proper side, and is prevented by the stream from crossing to the bank where Nature never intended it to reside. The entire account as given by the natives is opposed to the habits and manners of the genus; for at Bindrabun, Muttra, and various other places where I have seen them the males and females are promiscuously intermixed; and although quarrels will sometimes occur, yet as a general rule the whole community lives together in peacefulness. With the Himalayan species the custom is the same, the males and females remaining together at all seasons, even when the females have young ones at the breast, or are followed by yearlings. The only approach to a separation at any season consists in the males of a troop keeping together and the females doing the same if there are very young ones among them; but the two divisions form but one troop; and I am not even yet quite sure that such a trifling division really takes place.

According to the same authority we learn that Dr. Jerdon, of the Madras Army, has stated of the *Entellus* that, on the western side of India, “it is peculiar to the dense forests of the western coast. It abounds at the base of the Nilghirries, in Malabar, Travancore, &c., living in small troops, and has the usual loud cry of the others of this genus. The true *Entellus*,” he adds, “I have found chiefly in the neighbourhood of large towns, frequenting groves—also, however, in forest in Goomsoor, and open jungle in the Deccan.” Colonel Sykes speaks of the animal as being common in the Western Ghauts, where the Mahrattas call it *Mākar*, and do not venerate it.

\* J. A. S. B. vol. xii. p. 174.

As there can be no doubt but the forest is the natural haunt of this and other species, the fact of its being now so frequently found in groves in the vicinity of towns and villages is owing chiefly, if not entirely, to the veneration which often prompts the superstitious natives to introduce the creature into such places, where they are sure to be well fed and protected. This is clearly enough seen in the case of the Kishnagur Monkeys above mentioned by Mr. Blyth, which were introduced to that place many years ago by devotees, and have now increased and multiplied to such an extent as to have become a perfect pest. This fact was lately reported in 'The Delhi Gazette' of the 2nd of March, 1867, wherein a letter from a Calcutta correspondent states that a petition was presented by a large number of the native community praying that measures might be taken by the municipality to destroy some of the too numerous Monkeys that infested the station, causing fearful havoc amongst the fruit and grain. An order was issued, and five hundred Monkeys were killed. "There must be many thousands," continues the writer; "and all are descended from one pair originally brought to Kishnagur and let loose. This was soon succeeded by another petition from a different section of the native population, for the cancelment of the order to kill what they described as their long-deceased ancestors."

The true *Entellus* does not occur at all in Ceylon, although such has been stated to be the fact, but is entirely confined to the mainland, the name of *Hoonoomaun* being applied in Ceylon to another species, as it is on the continent of India to several others—and hence, in part, the confusion that prevails in regard to the true range of the *Entellus*.

Sir Walter Elliot gives the measurements of an adult male from the Southern Mahratta country as being, "from the muzzle to the insertion of the tail 1 ft. 10½ in.; length of the tail 3 ft. 2½ in.; height from heel to crown 3 ft. 2½ in.; weight 22 lbs." To this Mr. Blyth adds the colours as "constantly black hands and feet; the forearm, and leg externally, with the croup are of a pale *chocolat-au-lait* colour, extending more or less over the back, humerus, and thigh; and the rest is of a light straw-colour, or pale isabelline, with occasionally a tinge of ferruginous on the belly."

With regard to the distribution of the *Entellus*, the species is entirely restricted by nature to the right or southern banks of the Rivers Ganges and Jumna, the latter, as I think, bounding its northern range. It thus occupies parts of the southern Gangetic provinces, the Dukhun, and the Carnatic, down to the Malabar coasts, which form together a wide triangular geographical area. It has, indeed, been said to occur in Assam, which would carry it far across the Ganges to the eastward; but there is, I believe, no reliable instance on record of its having been procured from that eastern province. All that Mr. Blyth ventures to say on the subject is, that he has been "assured of its occurrence in Assam, though he never saw a specimen from that province." I am therefore inclined to think that some other species, probably *Semnopithecus pileatus*, has there been mistaken for it,

since there is among all these black-faced and long-tailed species so great a general resemblance, that it would be quite impossible, at any distance, for a mere casual observer to say with any degree of certainty what the animal seen might be. Moreover it is this very confounding of several distinct species in different parts of the country, under the long venerated title of Hoonoomaun, that has led compilers of works on natural history to declare that the range of that species extends from the sea-coast of the southern peninsula up to the northern ranges of the Cis-Himalaya. If, then, the Entellus has ever been seen in Assam, it is not because that province forms part of its natural range, but because, as elsewhere, it has been purposely introduced from religious motives; but, from all that recent writers on Assam and Bhotan have observed, I strongly doubt even whether any such introduction of the species has there occurred. The grounds on which its occurrence in Assam has been asserted I shall presently expose to view. How far up the country in a northerly direction the animal may be found is not easily determined, although I am inclined to doubt its occurrence indigenously higher than Allahabad, at the junction of the Jumna with the Ganges, through which point I would draw as nearly as possible a straight line across the country to the westward, as far as a little below Boondee, as the northern limit of its range. South of Boondee, and a few miles above Neemuch, the animal used to occur in a grove surrounding some Hindoo temples; but as I never heard of its occurrence elsewhere in the neighbourhood, I suspect it to have been introduced there from Muttra or Bindrabun.

That the Entellus has sometimes occurred abundantly at Bindrabun and also at Muttra does not militate against this view, inasmuch as, both being holy cities with hosts of bigoted devotees and fakirs, the animal has been purposely introduced to those localities, where it has always been held in great veneration, and has sometimes multiplied into many thousands in the gardens and groves surrounding the temples, while in the outlying neighbourhood it does not occur at all, except as an occasional straggler from the sacred band. That it is not indigenous there is proved by the fact that, although it has often been introduced, it never lives long in those localities, but from time to time dies out altogether. Johnson, in his 'Indian Field Sports,' tells us that when he visited Bindrabun there were then no monkeys of this species, but only the common brown Bunder or Rhesus. Here, then, we have a proof that the animal had been previously introduced and had died out; for Johnson's book was published in 1839; while in the spring of 1836, only three years before, when I passed a day at Bindrabun, they were numerous.

Turner in 1800 wrote that he had seen the Entellus at Muttra; in 1836 I also saw it at Bindrabun; yet in 1839, when Johnson's book was published, there were none left. In 1843 it was again brought into Muttra, and died out in a couple of years, while I am informed by a gentleman now residing in Muttra that at present, in the current year of 1867, while the Rhesus swarms there, the Entellus is altogether absent.



This clearly shows that the animal cannot bear even so slight a change of climate northward as Muttra and Bindrabun, and that it is certainly not indigenous in the neighbourhood; it accounts likewise for the difficulty of preserving the animal alive for any time in Europe.

These facts might be allowed to settle the question of range; for it is certain that the Entellus does not voluntarily cross the Jumna, or the Ganges, and therefore cannot wander up to the Himalaya mountains—besides that it could not live in such a climate, being seldom able even to round the Cape of Good Hope, and never long surviving its arrival in Europe.

The itinerant showmen from Meerutt declare that the Entellus may be seen at present in small parties between that place and Delhi, and that there are a few at Agra; but then, at the same time, they candidly acknowledge that the animal has been recently introduced there by fakirs and devotees.

In the extensive province of Oudh, stretching far along the left bank of the Ganges, the Entellus does not occur indigenous. This I have ascertained from several natives of that country, who declare that, if ever seen, it is near some temple where the fakirs have introduced them. One man informed me that, when he was quite a boy, he once saw one of these animals which was supposed to have crossed the Ganges accidentally on some boat or uprooted tree, the animal's advent being regarded by the natives as an auspicious event, and crowds assembling to see and to salaam to it. This appears to prove that the left bank of the Ganges is not the natural habitat of the species, since no notice would have been taken of the arrival of a single solitary individual had the species been common in the province. The long-tailed monkeys sometimes seen in the Nipal Terai are nothing more than the Himalayan Lungoor, a totally distinct species, known as *Semnopithecus schistaceus*; and, indeed, another native of Oudh informs me that, while the common Bunder is abundant throughout the province, the Entellus does not occur there, and that the long-tailed monkey sometimes seen in the Nipal Terai, or forest at the foot of the mountains, was the Hill Lungoor, and the only one of the genus to be met with.

There is, again, good reason to think that much of the confusion which prevails in regard to the geographical range of the species may have arisen from the fact that many of the natives have got into a habit of applying the name of Hoonoomaun to the common Rhesus, which actually does extend from Bengal, not exactly into the Himalaya, but up to the outer or southern boundary of the Dehra Doon, at perhaps a distance from the mountains of twenty-five to thirty miles.

In the Punjab, again, the Entellus does not occur; and I am inclined to restrict its range, somewhat loosely perhaps, to between  $10^{\circ}$  and  $25^{\circ}$  of north latitude, and  $75^{\circ}$  to  $88^{\circ}$  of east longitude, forming with the line drawn across the country from Allahabad to Boondee, a triangular range entirely south of the Rivers Jumna and Ganges. It does not, therefore, approach the foot of the Southern



Himalaya within 200 miles of their outlying ranges known as the Siwaliks.

With regard to its alleged occurrence in Ceylon, Cassell, in his 'Popular Natural History,' has been completely misled by trusting too implicitly to the lying legends of the Ramayau, in which the exploits of Hoonoomaun, in that island, are recounted. The species which in that locality bears this name is not, as we learn from the indefatigable labours of Mr. Blyth, the continental Entellus, but the *Semnopithecus thersites*, Elliot, a totally distinct species, which is restricted to that island; and the only other Monkeys there found, if we except those which may have been imported as captives, are the *S. cephalopterus*, *S. priamus*, *S. ursinus*, and *Macacus pileatus*.\*

Then, again, as to its alleged occurrence in Nipal and Bhotan, Cassell erroneously informs us (and not Cassell only, for Mr. Ogilby long since did the same before him) "that, though a native of the hot plains of India, it is able to sustain the rigors of a much colder climate."

I have shown, however, above, that it cannot bear even the slight change to Muttra and Bindrabun. "The monkeys of this species," continues Cassell, "ascend the Himalaya wherever wood is to be had; they are found in Nipal, a lofty mountain ridge, a great portion of which is always covered with snow, for its most elevated peaks are the highest mountains on the globe; and Turner even informs us that he met with these monkeys on the Alpine Plains of Bhotan."

Yet all this, although somewhat confident and high sounding, becomes in reality perfectly worthless when we call to mind the fact that Turner was no naturalist, and has evidently fallen into the fashionable error of confounding with the Entellus of the plains either the mountain Lungoor, or the *Semnopithecus pileatus*, or *S. barbei* (the two latter restricted to the south-eastern mountains)—an error from which Cassell evidently could not relieve him, and which has been repeated since Turner's day, by more competent observers, when the above-mentioned species had not, as now, been all recognized as distinct.

Now it was this very tenderness of constitution and inability of the Entellus to bear up against great changes of climate and temperature that made me, several years ago, contend in *epistolâ*, with certain naturalists, against supposing the mountain *S. schistaceus* to be identical with the lowland Hoonoomaun, as likewise that the Rhesus should, on the score of climate, be held to be distinct from the supposed diminutive Rhesus of the mountains. My reasoning was not then admitted as conclusive; and as my opponents were men of weight, I temporarily gave in and bided my time. Yet the Lungoor is now acknowledged to be distinct from the Entellus, and I have acquired the means of proving the Rhesus of the plains to be equally distinct from the Bunder of the mountains. Nipal, however, is not exactly "a mountain ridge, a great portion of which is always covered with snow," but is, on the contrary, a rather warm valley of no great elevation, situated far to the south of the snowy ridge,

\* J. A. S. B. xvi. p. 1271; Cat. Mamm. Mus. As. Soc. Bengal.

with a wide belt of mountain-forests between them ; and the Entellus, as previously observed, being entirely restricted by nature to the warm lowland regions below Allahabad, and to the right or southern bank of the Ganges, cannot very well ascend to the snowy ranges.

The late Dr. Griffiths, who accompanied Captain Pemberton's mission to Bhotan in 1837-38, does not throw much light on this subject, as he merely says, speaking of the animals, "Monkeys, as usual, abound on the lower ranges, on which the Hoolock of Assam likewise occurs. Some long-tailed monkeys occurred above Bulphai, at 8200 feet above the sea ; and in January I likewise saw a flock of noble ones not far from Tongsa, at an elevation of 5800 feet ; these were white, and in form and size resembled the Lungoors"\*.

This is all very loose writing, and not a single species is determined—besides that the name of Lungoor is applied to more than one species, although Dr. Griffith being a Madras officer may have had the Entellus in his mind. The matter is thus left in doubt, and we know not to what species he alludes, to say nothing of the fact that neither the Entellus nor the Lungoor of the north-west is "white"†, the colour of adults in the latter species being of a dark slate-colour, while the Entellus is of a rusty *chocolat-au-lait*. Moreover the north-western Lungoor is not by any means likely to occur in the hot regions where the Hoolock of Assam is common, especially when, in the latitude of 30° north, it does not descend lower than 2000 feet even in the depth of winter.

Dr. McClelland, who visited Assam in 1839, makes no allusion whatever to the Entellus, although he notices the Hoolock and a species of monkey allied to the Rhesus, under the name of *Macacus assamensis*.

All things considered, then, I am inclined to regard the species seen by Turner on the heights as neither the Entellus (which assuredly does not occur there) nor the mountain Lungoor, but a totally distinct animal, which Mr. Blyth has described in the 'Journal of the Asiatic Society of Bengal,' vol. xii., under the appropriate name of *Semnopithecus pileatus*, which "abounds on the skirts of the Tipperah hills, retiring far into the interior during the rains, and is common also on the Naga hills and mountainous regions of Sylhet and Chittagong." It is, therefore, by no means difficult to perceive that the next step would carry it to the adjacent region of Bhotan itself ; and as Turner was no naturalist, he would in all probability have been deceived by a general resemblance in colouring.

When speaking of the Entellus, Mr. Blyth remarks that M. Duvaucel observes, "that the appearance of that species in Lower Bengal takes place principally towards the latter end of winter ;" upon which, Mr. Martin notes that it appears to migrate from the upper to the lower provinces of this part of India. I can only state, continues Mr. Blyth, "that I have found them equally numerous in July and January in the particular locality adverted to, and I have seen them in June close to Calcutta on the opposite side of the river.

\* J. A. S. B. viii. p. 722.

† *S. barbei* has shoulders and arms externally silvery !

With regard to the alleged migration of the Himalayan species also, Captain Hutton mentions that 'this species is found at Simla all the year through; but when the snow falls during the winter it seeks a warmer climate in the depth of the khuds, returning again to the heights as it melts away.' I have seen them, however, on a fine sunshiny day, even with the snow on the ground, leaping from tree to tree up and down the hill of Jákú at Simla, which is about 8115 feet. Royle is mistaken when he says that the Entellus alone ascends in the summer months as high as 9000 feet. I have seen them at Nagkunda in August at that elevation, and in winter on Háttú Mountain, which is 10,655 feet—and in winter at Simla, with snow 4 or 5 inches deep and hard frosts at night, as high as 8000 feet. The *Macacus rhesus* was also repeatedly seen during the month of February, when the snow was 5 and 6 inches deep, at Simla, roosting in the trees at night on the side of Jákú, and apparently regardless of the cold"\*.

There is in all this a great deal of error, for part of which I am responsible, and which it is high time should be corrected.

In the first place, then, I am fully convinced, as Mr. Blyth also appears to be, that there is no true migration of the Entellus, in the proper sense of the word, from the upper to the lower districts of Bengal. The animal will vary in numbers at different seasons, according as food is scarce or plentiful; and wherever this is most abundant and most palatable, there it is probable will the Entellus be found in abundance also. I have already shown that the animal's constitution will not permit it to live long even at Muttra and Bindrabun, and consequently that its existence in the Himalaya is utterly impossible. At the time when I, and Dr. Royle before me, confounded the Entellus with the Himalayan Lungoor, the species were not admitted by naturalists to be distinct; for although I stated my own doubts of their identity, yet I had, in 1837, against me the weighty authority of Mr. Hodgson in Nipal and of Dr. J. E. Gray in England; so that, being myself but a tyro, I was compelled to give in. The same error arose also in regard to *M. rhesus*, which is not found within the mountains. My remarks, as it now appears, refer to more than one species of Bunder, which are distinct from the Rhesus and confined to the Himalaya.

It was necessary to say thus much regarding the Entellus in order to correct the erroneous notion that prevails respecting its occurrence in the Himalaya, the base of which it does not approach within several degrees. In the north-western portion of those hills it is replaced by the so-called Lungoor, while to the south-east occur the species now known as *Semnopithecus pileatus* and *S. barbei*, it being very doubtful, from what I can learn, whether the Lungoor extends its range so far to the eastward, or, indeed, beyond the eastern frontier of Nipal.

And now a word, in conclusion, as to the alleged occurrence of the Entellus in Assam. The error in this respect appears to have entirely originated in the unauthorized change of a name used by M.

\* J. A. S. B. xii. p. 174.

Duvaucel. Mr. Ogilby, in his 'History of Monkeys,' when remarking upon M. Duvaucel's adventures with the Entellus, informs us that by "Gouptipara," the name of the place where the animal was shot, "he appears to mean the city of Goalpara." On the contrary, however, he appears to mean nothing of the kind; for he distinctly states that the city of Gouptipara, where he shot the animal, was a holy place with many temples, and situated on the river Hooglee, somewhere near Chandernagore in Lower Bengal, and therefore not far from Calcutta; whereas Goalpara is situated on the Burham-pooter river in Assam, about 200 miles away. The fact is that Mr. Ogilby, being better acquainted with menageries than with the geography of India, took upon himself to alter the names of the places, and by so doing gave rise to the erroneous idea that the Entellus occurs in Assam. But besides giving us the River Hooglee and Chandernagore as guides to the locality, M. Duvaucel likewise plainly speaks of his having been thwarted by "the Bengalese," who constantly scared away the monkeys; whereas, had he alluded to Goalpara, he would have called the people "Assamese."

Hence the error in this respect appears to be entirely owing to Mr. Ogilby's ignorance of the geography of the country, and to his unwarrantable alteration of the name furnished by M. Duvaucel.

The remarks now made, founded upon long and patient research into the history of the animal, will, I trust, not prove unacceptable to my brother naturalists in Europe.

---

December 12th, 1867.

Dr. J. E. Gray, F.R.S., V.P., in the Chair.

The following extract was read from a letter addressed to the Secretary by Dr. John Kirk, C.M.Z.S., dated Zanzibar, Sept. 7th:—

"In the collection of animals in spirits now ready for transmission to England by the first opportunity, I have placed several specimens of the *Galago* of the island of Zanzibar; which, I can now assure you, is very different from that of the opposite coast. I have kept specimens of both here: the colour, form of snout, size of ears, &c. are very distinct. The species of the coast is, no doubt, *G. crassicaudatus*, while I presume the island one is *G. agisymbanus*, of which there are no specimens in England.

"I am not satisfied regarding the little Antelopes of this island, whether there are not two species; the texture of the fur varies much, also the size of ears; but I have not had an opportunity of comparing a sufficient number of specimens to be certain.

"I have only three species of Bats from Zanzibar; this is singular,